



# ROUNDTABLE

The Denver Radio Club Newsletter

May 2008

Since 1917

## PRESIDENT'S MESSAGE

By Gerry Villhauer-W0GV

Greetings DRC Members,

It looks like spring is finally getting here. That is what I was thinking a couple weekends ago anyway. The weather forecast looked good so we organized a work party to put up antennas at our new site at Centennial Mountain. As Colorado weather usually does, it changed quickly, especially at an elevation of over eight thousand feet. The wind was so strong that we could only put up our vhf antenna at a real low level on the 200 foot tower. So the 145.490 repeater is again operating but at reduced performance. We have another site visit planned and hopefully we will raise our vhf antenna and also install the uhf antenna for our 448.625 repeater at the same time. Thanks to all the crew who helped at the site. There will be more on our trip and pictures further in the body of this edition. Let's all hope for favor from Mother Nature. Keep tuned to the nets for information on our progress.

I would like to welcome new DRC members Timothy McAuliffe, KDOCZT, Keith Moore, N2IZB, Russ Young, W0EXR. Thank you for choosing the Denver Radio Club as your club. Please come to the meetings and activities and be an active member.

Thanks to Bryan, KB0A, for presenting last month's program on Smith Charts. His explanation sure took away some of the mysteries of this useful tool. This month's program will be one you won't want to miss. Gordon Hardman, W0RUN, will be presenting our program. Gordon was licensed in 1967 as ZE1DC. Gordon has designed AMSAT Spacecraft and served as project manager. He has been in many DX contests and won the African division of CQWW and is also a long dis-

tance runner (take a second look at his call sign). He currently is in RFID design and chief engineer for Alpha Radio Products, located in Boulder. He will be telling us about the Alpha Linear Amplifier product line and other interesting items produced by Alpha Power along with information about high power tubes. Alpha amplifiers are world renown as the finest linear amplifiers made. Gordon promises to be a very interesting program provider. Let's have a big turnout for him.

See you all at the meeting May 21st at the St. Joseph's Episcopal Church, 11202 West Jewell Ave., Lakewood. That is about two blocks West of Kipling on West Jewell. And remember to check our website, w0tx.org, for lots of important information about the DRC. The Elmer Session and Tech Meeting start at 6:30 p.m. followed by the Regular Meeting and Program at 7:30 p.m.

73  
Gerry, W0GV



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## APRIL MEETING - WHAT'D I MISS

BY BILL - W6OAV

In spite of a nasty snow storm, we had a great turn out for the monthly April club meeting. After attendee introductions, W0GV gave a slide show presentation showing the new Centennial Cone site. He covered the trials and tribulations experienced last week by the group as they attempted to install the 145.49/448.625 system at Centennial Cone. W0GV also updated the group on the upcoming DRC/SA pre-Field Day exercise. Both activities are described elsewhere in this publication.

Our guest speaker, KB0A, then gave a very enlightening presentation covering the Smith Chart. He did a great job, especially in the area of covering complex items such as Imaginary Numbers, J factors, etc. All those circles, curves and lines on the Smith Chart now make sense to a lot of us! Thank you, Bryan.



After KB0A's presentation, the usual door prize drawings took place. Several attendees went home with nice prizes.

## ELMER SESSION

By Rob - AJ0C

Presentation By Oscar - K0SSE, Field Day 2008. For more information check the Pre-Field Day Exercise article on page 5.



## TECHNICAL COMMITTEE REPORT

By Bill - W6OAV

The report gives an over view of the items discussed at the April Technical Committee meeting.

### 145.49/448.625 Relocation Project

Goal: Relocate antennas and repeaters at Centennial Cone.

- Planning to go back to Centennial Cone at the beginning of May to remount the VHF antenna at its intended location and to install the UHF repeater and antenna.

### 147.33 Relocation Project

Goal: Bring a second 147.33 repeater on line at Hudson with a different PL. Activities required for the installation.

- CCARC approval – KB0A has received coordination approval for Hudson location.
- S-Com programming - N0YIX programmed the S-Com which is now in the hands of the tech committee. Have all necessary interface cables
- ICOM modification –WA9TVH has determined how to get the compensation voltage to the transmit ICOM (an EC type) to work. WA9TVH will have need to jumper the Mastr II board.
- Duplexer tuning - WA9TVH has pre-tune.
- Setup a work party – All equipment is ready. A work party will be setup soon after the Centennial Cone site installation is complete.

### DRC/Salvation Army "Pre-Field Day Exercise

Goal: Prepare for and participate in the Field Day exercise at the Hudson site.

- K0SSE has been out to the Hudson location to determine logistics.
- KB0A will prepare a notice for the club website covering both the "Pre-Field Day" exercise and the Field Day plans.

### Failed Salvation Army Ham Station Power Supply

Goal: Repair the main 12 volt Astron power supply.

- Will need to pull out the PS and find the problem. Talked of replacing with a Samlex PS, though need more power since there are now two transceivers on the 12-volt system.

(Continued on page 3)

(Continued from page 2)

- Need to obtain and install isolation diodes between the power supply and the batteries.

**220 Repeater**

Goal: Install ID'er.

- KB0A is designing and wiring the necessary equipment and will have WA9TVH verify the wiring design prior to installation.

**147.33 Station 4 Power Supply Switch**

Goal: Troubleshoot and fix an intermittent power supply OFF/ON power switch which cuts power to the controller.

- Discussed replacing the switch. Needs investigation. The schematics do not show it switching the 12 volt to the controller.

**Packet gateway**

Goal: Install a new HF antenna.

- The original antenna was too close to the packet station causing the TNC to default.
- W9UW donated a weather proof enclosure.
- WA9TVH will use a punch machine to make the necessary mounting holes in the enclosure.
- W6OAV will obtain the Hamsticks, preassemble, and then pre-tune the system at home.
- W0HTX will mount the antenna once it has been pre-tuned.

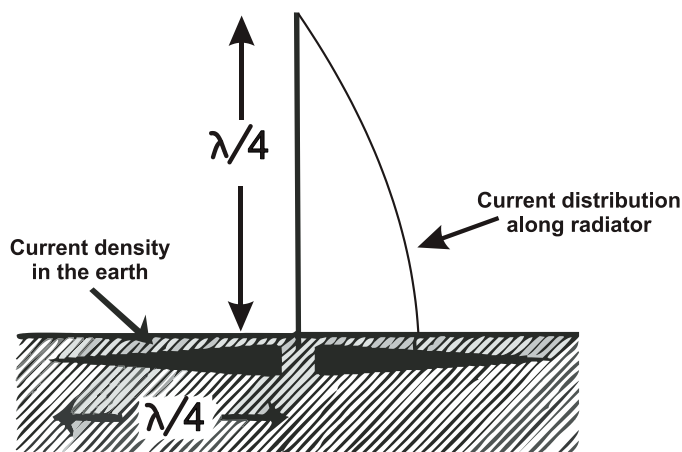
**WM Fire Station 4 Power Line Noise**

Goal: Force Xcel to reduce power line noise which affects all systems at Station 4.

- Discussed various ways to pursue this issue as it could be detrimental to our ability to provide emergency communications if needed. Further discussions are necessary.

vertical are used to reduce the RF current loss in this ground plane.

As shown in below, the RF current flows back and forth in the top few inches of the lossy earth around the vertical. Radials placed in the top inch or so of the earth provide a less lossy path for the RF current flow. Less loss here means more RF current is available for the vertical element.



**Radial Resonance**

Radials in the ground are NOT resonant. They are so tightly coupled to the earth that resonance is impossible. Therefore, don't spend time trying to cut radials to exact 1/8 or 1/4 wave lengths. Remember, radials are just non-resonant low loss conductors on or in the lossy ground. Some hams, instead of laying out radials, decrease ground loss by laying chicken wire out from the base of the vertical.

In the following discussion, wave length refers to the physical length of a radial and not to the electrical length. Again, as described above, radials in the ground cannot be resonant and therefore do not have a resonant length.

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**RADIALS DEMYSTIFIED – PART 2**

By Bill - W6OAV

**GROUND MOUNTED VERTICALS**

Part 1 of this article discussed elevated verticals. Part 2 of this article discusses ground mounted verticals.

**Purpose And Characteristics Of Radials On Or In The Ground**

Unlike elevated verticals, radials on a ground mounted vertical DO NOT provide the ground plane. The earth itself provides the ground plane, be it a very lossy ground plane. Radials on, or in, the ground around the

**Radial Length**

As shown in figure above, most of the RF current occurs within 1/8 wave length of the base of the vertical. Therefore, if you only have so much wire to use, more 1/8 wave length radials are better than fewer 1/4 wave length radials. The idea is to minimize loss where most of the RF current exists. For example, going from four 1/8 wave length radials to four 1/4 wave length radials will buy very little improvement in radiation efficiency. Going from four 1/8 wave length radials to eight 1/8 wave length radials will improve radiation efficiency.

Reference 1.

(Continued on page 4)

*(Continued from page 3)*

Extending the radials beyond a physical ¼ wave length from the vertical will not increase radiation efficiency. RF currents beyond ¼ wave length are very minimal. That is why commercial radio stations do not lay out radials longer than ¼ wave length. Doing so would be very expensive and contribute little to increasing radiation efficiency. *Reference 1.*

**Number Of Radials**

There is a point of diminishing returns concerning the number of radials. As the number of radials increases, the cost linearly increases but the radiation efficiency gained levels off. Sixteen ¼ wave length radials is optimum for cost verses increase in radiation efficiency. Increasing the number of radials from four to sixteen radials increases radiation efficiency significantly. Increasing the number of radials from sixteen to one hundred and twenty radials increases radiation efficiency by only one or two dB. *Reference 1.*

**Radial Gauge And Insulation**

The gauge of a radial wire is not important for normal amateur power levels. The RF loss of the smaller wire gauges is minimal. Also, insulation on a radial wire has no effect on radiation efficiency. However, the insulation is recommended to protect the radial wire from corrosion.

*Reference 1: W.B.Cebik, W4RNL at <http://www.cebik.com/>. W4RNL's site has an extremely impressive collection of antenna articles.*

**Continued in Part 3 – Radial-Less Verticals, Elevated Verses Ground Mounted Verticals**

**CENTENNIAL CONE PROJECT**

By Bill - W6OAV

During March the 145.49/448.625 repeater system had to be removed from the Green Mountain site. The removal was due to the loss of room created by the expansion of the commercial communication systems.

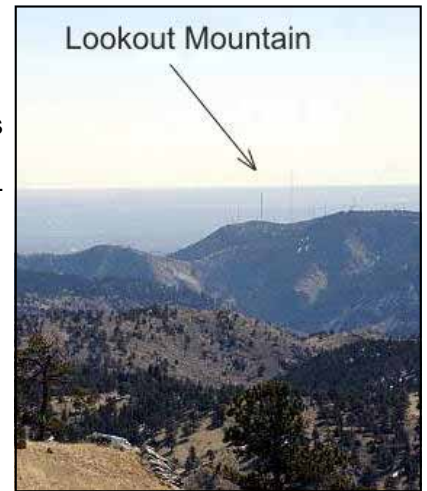
Board members made arrangements to install the repeater system on Centennial Cone North West of Look Out Mountain. The facility consists of a 200' tower and an up to date very clean modern building with generator backup.

**Figure 1** shows the tower.



*Figure 1*

**Figure 2** shows the view looking South East from the facility. Look Out Mountain is the hill with the towers in the right of Figure 2. The elevation of the site is approximately 8,450' ASL.



*Figure 2*

On April 6<sup>th</sup> the following DRC members went to Centennial Cone to install the 145.49/448.625 system: W0GV, W0GN, K0HTX, K0BA, WA9TVH, K0RCW, N0TBM, AC7SX and K0TOR. However, things did not go according to plan. W0GN, K0HTX and N0TBM climbed to tower to begin the antenna installation. As they began the work, a cold strong wind began blowing. Not only did the tower climbers have to fight the wind, their hands began to numb. So, the decision was made to temporarily mount the VHF antenna between the lower two side arms of the tower instead of further up the tower. Unfortunately, interference occurred to another amateur repeater. So, the antenna was temporarily mounted below the lower side arm which cured the interference. Weather conditions by this time precluded installing the UHF antenna.

**Figure 3** shows how a well fashioned tower climber dresses. Thanks K0HTX for modeling for us.



*Figure 3*

*(Continued on page 5)*

## UP COMING EVENTS

### DRC'S "PRE-FIELD DAY EXERCISE"

By Bill - W6OAV

Mark your calendars for May 31<sup>st</sup> and June 1<sup>st</sup>. The DRC, in conjunction with the Salvation Army, will be conducting a "pre Field Day" exercise at the Hudson site. The Salvation Army will provide the communications van and the canteen for food service

The purpose of the exercise will be to:

- Test getting the communications van and mobile tower operational.
- Test installing various HF wire antennas. These will include NVIS, verticals and G5RVs.
- Get operators familiar with operating the communications equipment.
- Develop an operational plan for field day.
- Meet the annual DRC commitment to clean up the site. Participating members will be asked to bring rakes, shovels, weed whackers, etc, for a quick cleanup project.

The plan is to have five HF stations operational. Technician class license holders will be able of operate the HF stations. So, if you haven't experienced HF operations, here's an opportunity! More details will be published in the next issue of the "Roundtable".

*Go to Page 6 for Directions and Map exercise location.*



Figure 4

Figure 4 shows WG0N (lower) and K0HTX (higher) climbing the tower. This figure ought to help you appreciate what our climbers go through to keep our repeaters on the air!!

The present plans are to send up a work party to Centennial Cone to complete the installation in early May. A big thanks to the

group mentioned above who braved the elements to at least get 145.49 back on the air. Also, thanks to K0RLW for the pictures.

Field Day '08

June 28-29

Plan to Participate!



### VE Team Activities

By Robert - K0RCW

Five Denver Radio Club Volunteer Examiners (VEs) met early on Saturday, April 19<sup>th</sup> at the LDS Church at 6465 West Jewell to administer license examinations.

There were a total of 11 new applicants and one retest. The examinations resulted in eight new Technician, one new General, and one new Extra class license. Many of the newly minted Tech licenses are recent graduates of Rob Rude's (AJ0C) technician Class.

Volunteer Examiners included :

- Wally Gamble - AC0T*
- Bryan Steinberg - KB0A*
- Mel Minnick -KOMEL*
- Tom Kocialski - KC2CAG*
- Robert White - K0RCW*

We are very grateful to the LDS church for graciously letting us use their meeting hall for the exam session.

# PRE-FIELD DAY EXERCISE DIRECTIONS

By Bob - KC0CZ

## From Denver

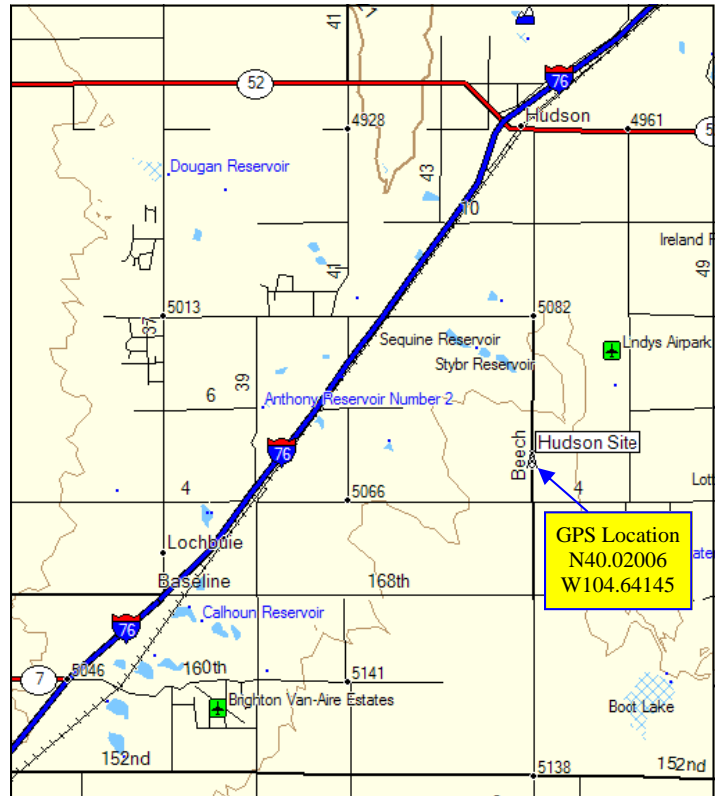
To drive to the Hudson Tower from Denver, take Interstate 76 East to Exit 25, Lochbuie exit. Exit I-76 and go East on 168<sup>th</sup> Avenue 4 miles to County Road 45. Turn North on CR45 for 1.3 miles and the tower will be on the West side of the road.

## From Boulder

Take Highway 7 East past I-25 into Brighton. Continue East through Brighton until you reach I-76. At I-76, take either the frontage road on the East or West side of I-76, you cannot enter I-76 from Highway 7. You will travel North on either frontage road to 168<sup>th</sup> Avenue, about one mile. Turn East on 168<sup>th</sup> Avenue for 4 miles to CR45. Turn North for 1.3 miles to the station on the West side of the road.

## Hudson, CO Information

The town of Hudson is located 3.5 miles North on CR45. You will find a couple of restaurants, Pepper Pod one of the old establishments. On the West side of I-76 on Highway 52, you will find a new truck stop facility with gas, Subway & Carl's Jr.



May 2007							<i>DRC Net Sunday 8:30pm Local</i>
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
				1	2	3	
4	5	6	7 <i>Learning Net</i> 7pm	8	9	10	
11	12 <i>Happy Mother's Day</i>	13	14 <i>Learning Net</i> 7pm	15	16	17 <i>Armed Forces Day</i>	
18	19	20	21 <i>DRC Meeting</i> Elmer 6:30pm General 7:30pm	22	23	24	
25	26 <i>MEMORIAL DAY</i>	27	28 <i>Learning Net</i> 7pm	29	30	31	

Check [www.ARRL.org](http://www.ARRL.org) for More Contests & Rules!

## DRC BOARD OF DIRECTORS

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Board Member	K0RCW	Robert White	303-619-1048	rcwhitejr@mac.com

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## DRC REPEATERS

BAND	Freq / Shift / PL Tone	Additional Information
10m	29.620mHz (-100kHz) FM	Temporarily OFF The Air
6m	53.090mHz (-1mHz)	
Packet	145.05mHz<->14.105mHz	HF side Down, waiting for new antenna
2m	145.490mHz (-) 100Hz PL	
2m	147.330mHz (-) 100Hz PL	Members Auto-Patch
1.25m	224.380mHz (-) 100Hz PL	Temporarily OFF The Air
70cm	448.625mHz (-) 100Hz PL	Temporarily OFF The Air
70cm	449.350mHz (-) 100Hz PL	Wide area coverage with Echolink Node # 4140.

## EDITOR'S NOTE

*DRC members - this is your newsletter. If there is something which is club or amateur radio related that you'd like to see as a regular feature, email suggestions to the editor. Members are the heart and sole of The Denver Radio Club, if you have an expertise or an interest in a particular segment of ham radio that you'd like to write about, you may email your submissions to DRC\_RT@comcast.net. Submission deadline is the 25th of the month. Editor*

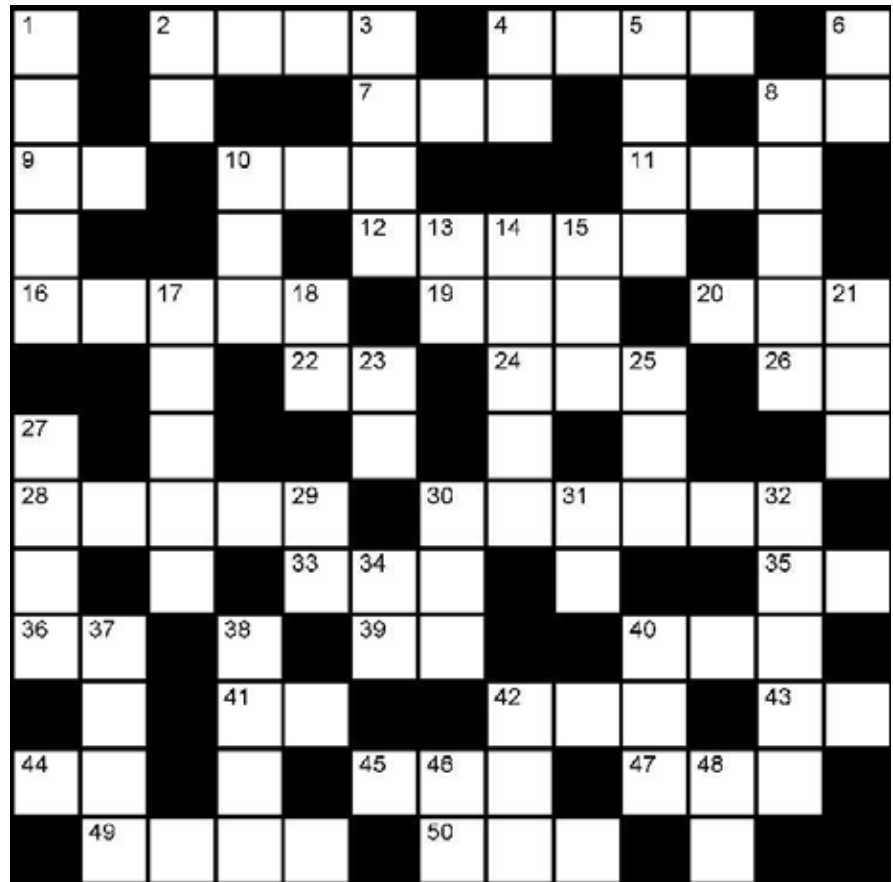
# Puzzle Page

*“Think Small”*

Crossword puzzle creators are always using those maddening little short thingamajig space fillers known as abbreviations and acronyms. This puzzle may look a little small, but that’s because it’s composed almost entirely of--you guessed it--abbreviations and acronyms. The lion’s share of these refer to the labels and controls you’ll find on the front panels and keyboards of our radio equipment. There’s a few odd-balls thrown in for spite...uh, I mean spice. Have a good holiday “Laboring” over this one.

By H. Ward Silver, N0AX

**NOTE: Answer key for this puzzle is located on page 5.**



**Across**

- 2. Increases "talk power"
- 4. Can't change frequency
- 7. Scares birds off the antenna
- 8. Keeps noise silent
- 9. Transmit
- 10. Stores frequency info
- 11. Levels out the receive audio
- 12. Controls transmitter output
- 16. Narrow rejection filter
- 19. Lower light level
- 20. Operate with a repeater
- 22. Final gain stage
- 24. Plate current at tank resonance
- 26. Two components of radio wave
- 28. Controls words per minute
- 30. Jack for a headset
- 33. Level of AM central component
- 35. Made it yourself
- 36. Front end gain
- 39. Mixer input
- 40. Medical technique that uses RF pulses
- 41. Receive
- 42. Main tuning component
- 43. F3 emissions
- 44. Empty
- 45. Changes CW pitch
- 47. Adjust transmit frequency
- 49. To continually adjust the gain
- 50. Transmit oscillator

**Down**

- 1. Reduces signal strength
- 2. What the transmitter delivers
- 3. Squeezes voice into narrower range
- 4. Telephone
- 5. Adjust receive frequency
- 6. Control frequency response
- 8. Displays signals graphically
- 10. Spoken audio level control
- 13. Outside diameter
- 14. Amount of receive bandwidth
- 15. Interference from transmissions
- 17. Accessory that matches impedance
- 18. More than low power
- 21. Type of copper wire
- 23. Speaker volume
- 25. Strong signals do this to a meter needle
- 27. Voltage ratio in transmission lines
- 29. Battery power
- 30. A "super" receiver from Hammarlund
- 31. The most important piece of equipment
- 32. Vary the intermediate frequency
- 34. Light metal used for antennas (chemical symbol)
- 37. Reduces receiver bandwidth
- 38. Tunes a tube's control element
- 40. Manual transmit
- 42. Activate transmitter by voice
- 46. Prefix for Yaesu/Vertex HF rig models
- 48. Collector current