



# ROUNDTABLE

The Denver Radio Club Newsletter

Since 1917

100 years of amateur radio in Colorado

December 2017

## PRESIDENT'S MESSAGE

BY GERRY VILLHAUER, W0GV

Hello DRC Members,

When I wrote my president's message in October it was 80 degrees. As I write this month in November, it is 75 degrees. We are getting unbelievable weather patterns. With all the severe storms in Texas and elsewhere, it seems to me there is little doubt we are in for big weather changes in the future.

At our November meeting Paul Olsen (K0WSU) was elected to a board position vacated by Jason Smallwood (AC0UA). Jason resigned his position due to his work schedule. Thanks to Jason for his years of service to the board. Thanks and congratulations to Paul for stepping up to serve in this important DRC position.

We are two weeks from our annual DRC Holiday/Christmas Party. **If you have not mailed your reservation, PLEASE do so TODAY!** Go to our website [www.w0tx.org](http://www.w0tx.org) or see the printed form in this edition of the Round Table. Don't miss the Fellowship, Food, Program, Prizes and Fun at our new, very spacious venue. Please get your reservation mailed today! Speaking of our program, we will have Jeff Irvin (KBOCHT) the Executive Director of the JCECA and a DRC member as our guest speaker. That is the Jefferson County Emergency Communications Authority; Wow, that is a mouthful! Jefferson County is about to go live with their new communications center. The center will handle 911 and dispatch operations for most agencies in Jefferson County including Police, Fire/Rescue and EMS services. Jeff will be telling us how that all goes together in this new ultra modern facility; which is housed in the West Metro Fire Headquarters building. Whether you are a Jefferson County resident or not, I am sure you will find his presentation very interesting and informative.

Thanks to Paul Olsen (K0WSU) for a very interesting program on Traffic Engineering which was presented at our November meeting. Paul showed us the progression in traffic engineering from the early days of automobiles to what we can expect with automation in the future. Many questions were generated, which is always an indication of an informative program. Thanks Paul!

Thanks to our new members for making the DRC "Your Club". Please come to meetings and other events and stay active. Your name and call will be listed in this issue of the Round Table.

And a reminder, the last day to mail your reservation for the Holiday/Christmas Party is December 11<sup>th</sup>. — **Please Make The Holiday Party Reservation NOW!**

73 for now,  
Gerry (W0GV)  
President



### INSIDE THIS ISSUE

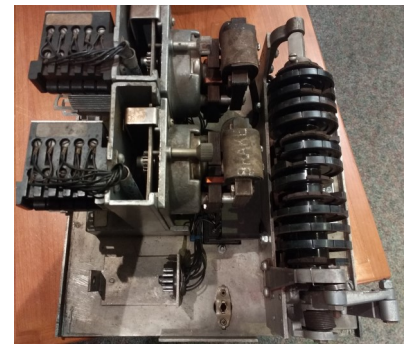
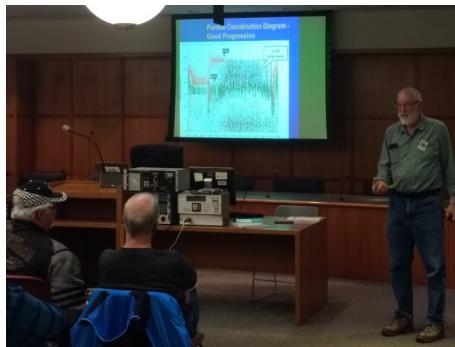
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### NOVEMBER MEETING – WHAT'D I MISS?

BY BRENNAN PATE, AD0UZ

November's meeting started out with greetings and introductions of half a dozen guests. Gerry (W0GV) made a holiday party announcement and let everyone know they are welcome to come to the event and listen to the speaker, even if they don't buy a meal ticket and have a meal. He also talked about some technology enhancements that are currently under development that will help people establish or renew their membership online. Next, a DRC board nomination for Paul Olson (K0WSU) was put forward and he was confirmed. He'll take the remainder of the term for Jason Smallwood (AC0UA).

Paul also happened to be giving the talk for the night. The topic was about automobile traffic management. He was one of 3 federal traffic managers when he started his career. He played a video that was made in 1937 that described the traffic control systems of the time and how they helped society get where they needed to go with greater safety. Paul talked manually controlled systems and the progression (including some early versions that were controlled by honking your horn) through today's RF and video / motion controlled devices. He talked about how traffic patterns are monitored and the analysis of the data for light timing and other flow issues. In the future, autonomous driving will drastically change things and help with flows. The DSRC 5.9 GHz (Designated Short Range radio) standard is available but the problem is that many municipalities need to upgrade their equipment at significant cost. Overall, it is a slow-moving industry with about five vendors nationally vying for hegemony. Lastly, there were quite a few Q&As and some control systems on display to look over.



### WHO'S NEW IN THE DRC?

BY BOB WILLSON, KC0CZ

The DRC is a very active club in the Denver metro area and we'd like to have all of our members listen for these new calls and personally to make them feel welcome. Welcome to our newest members:

Jerri Arnold	W0JNI	Frank Philipp	N0YKA
Paul Solari	K0SOL	James Little	W0JSL
John Blakely	KE0ORB	William Bierbach	KD0WSD

We have a number of activities throughout the year and we'd like very much for you to participate in serving your community. If you have questions please feel free to ask on any of the repeaters or see the contact information on the last page of this publication. Also, please join us once a month at the regular club meeting on the 3rd Wednesday at 7:00 p.m. For new hams we have the Elmer session which starts at 6:00 p.m. before the regular meeting.

**WHAT IF THE WEATHER CHANGES?**

*If we should experience a turn in the weather on the day of our monthly DRC meeting it may be necessary to cancel the meeting. If this should happen listen for meeting status reports on 145.49 or 448.625 MHz repeaters during the afternoon on the day of the meeting.*

## TECHNICAL COMMITTEE REPORT

BY BILL RINKER, W6OAV

The following is an overview of the subjects discussed at the November Technical Committee meeting.

### DRC/TSA Aurora Site

Goal: Maintain contact with TSA relative to establishing a "communications room" for the DRC.

Status: WW0LF sent a letter to the TSA describing the services that the DRC can provide and recommendations for the communications equipment and antennas. WW0LF will meet with the TSA representative as soon as possible.

### Station 4 Remote Power Control

Goal: Install Internet controlled power outlets.

Status: WG0N has installed an Internet controlled outlet power strip at Station 4. KE0HFH will configure the system as soon as possible.

### Centennial Cone Remote Power Control

Goal: Document equipment to be controlled by the Internet controlled power outlets. Install the outlets.

Status: One the remote power control is operational at Station 4; the same system will be installed at Centennial Cone.

### Fusion Repeater Move

Goal: Discuss the feasibility of moving the Fusion repeater to a better coverage location.

Status: Feasibility study is in progress.

### Fusion Repeater Wires Interface

Goal: Get the Wires Interface on line.

Status: A local ham knowledgeable about Wires will meet several tech committee members at the site to program the interface.

### Fusion Repeater Wires Interface

Goal: Train several club members how to program and maintain the Fusion Repeater system.

Status: Once the Wires Interface is functioning, a group training session will be scheduled.

## DRC's 100TH ANNIVERSARY PINS

BY W0TX STORE

If you would like to commemorate the 100th year of the Denver Radio Club then ask about getting your very own commemorative pin. The cost is \$3 for one or two for \$5. They are available at the monthly face-to-face. The picture below is a mock up of the pin. They are about 1" tall and 0.75" wide.



## LEARNING NET REPORT

BY FRED HART, AA0JK

Thanks goes out to our net controllers: Larry (K0LAI), Alex (KS0E) and Fred (AA0JK). The following topics were discussed this past month:

- HRO Fall Fest
- Summits on the airwaves
- Go Box options
- Lithium phosphate batteries
- Yaesu FT-891
- Gator Box enclosure for Go Box
- Super mp1dxt r80 antennas
- Mountings for mobile antennas

Resources for vision impaired:

<http://www.arrl.org/news/library-of-congress-releases-free-braille-and-audio-reading-app>

Handiham.org: Amateur Radio & Assistive Technology for People with Disabilities

<https://www.handiham.org/drupal2/node/508>

We are always looking for additional net control operators. If you would like to participate we can help you with the basics of becoming a net controller. This is a great opportunity to learn and get experience running a net.

Net controllers are always needed to perform Emergency Communications services. In the event of emergencies such as floods, fires, or other public service, the amateur radio community is always ready to help. If you have an interest in participating, when the need arises, learn and train now to be prepared. For additional information contact our EmComm Coordinators: Mike Vespoli (KE0HFH) and Brennan Pate (AD0UZ), at [emcomm@w0tx.org](mailto:emcomm@w0tx.org).

Great topics from our group. We certainly enjoy everyone's participation. Thanks to all.

If you are listening and don't yet have your license, you can contact us via [w0tx@w0tx.org](mailto:w0tx@w0tx.org) or [elmer@w0tx.org](mailto:elmer@w0tx.org).

If we don't have the answer here on the net, we have a lot of experienced hams in the club that can help. Questions can also be submitted on the YAHOO Learning Net web page <https://groups.yahoo.com>. Here you will also find information from past activity that you might find of interest.

Getting that first Technician license? Upgrading to General or Extra? We're here to help. We would encourage those who have been Hams for several years to also join us. Your experience and input is welcomed. What topics would you like to discuss? Join us Wednesday nights, 7:30 PM, 145.490 / 448.625.

(Note: The third Wednesday of the month is devoted to the DRC club meeting. See the [W0TX web site](#) for additional information.)

73,

Fred  
AA0JK

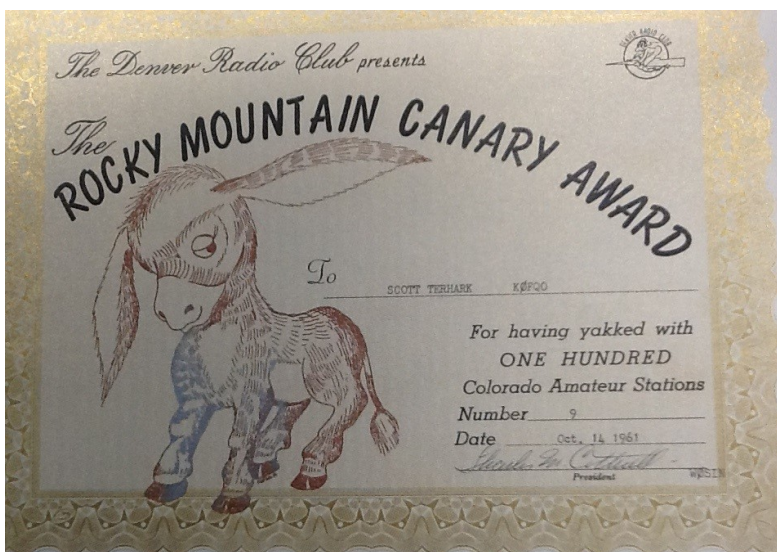


### BLAST FROM THE PAST

BY SCOTT TERHARK, N0GXM

I was first licensed in 1961, first as a novice and later as a general in the same year. I was only 15 when I joined the Denver Radio Club and started going to meetings with the help of older hams who had a driver's license.

I was able to enjoy club activities such as transmitter hunts, club meetings and being able to meet all the local hams I was talking to at the time. One of the cool things was being able to earn certificates for contacting and then confirming that contact with a QSL card. Proof would be shown and these certificates would be issued. Here is one that I received under my first call.



Congratulations to The DRC for being around for 100 years. Thank you for all that you do for ham radio.

I am still active on the bands, using mostly vintage equipment on AM, SSB and CW, even after 56 years. I tend to be more active in the cold months when I am not outside as much.

73 and BCNU on the air,

Scott  
N0GXM



[Editor's note: If you would like to have your ham radio story and/or QSL cards published in the RT, please send them over to [drc.editor@gmail.com](mailto:drc.editor@gmail.com). We can always embellish details if you feel your life is way too boring for our audience. Just kidding. Everyone has an interesting story.]

### SOLAR UPDATE

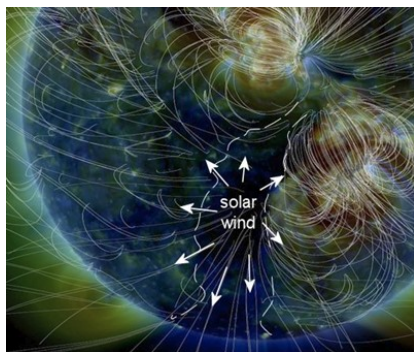
PROVIDED BY Fred Hart, AA0JK

November 1st - Solar activity was remaining at very low levels. Regions AR 2685 and region AR 2685, were decaying and inactive. No Earth-directed CME's were observed in the corona-graph imagery.

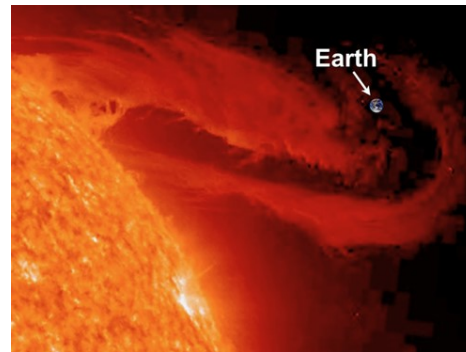
The forecast was for very low solar activity for the following three days. That is unless, what do we have here? Solar activity does not adhere to forecasters. Time for an update.

Update... A hole opened up in the sun's atmosphere, and it was spewing a stream of solar wind towards Earth. Estimated time of arrival, November 2nd.

This image, shows the structure facing Earth on October 30th :



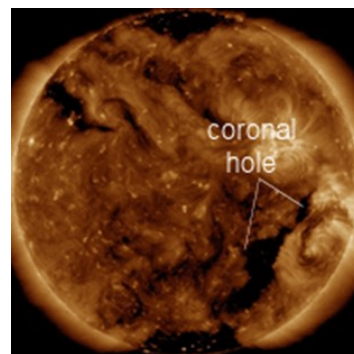
Credit: NASA's Solar Dynamics Observatory



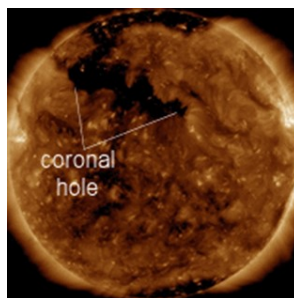
The southern orientation of the opening was expected to direct the solar wind stream so that it hit Earth off-center, mitigating its effect.

NOAA forecasters said that the leading edge of the solar wind stream may contain a shock wave-like structure called a CIR (co-rotating interaction region). CIRs are transition zones between slow- and fast-moving solar wind. They contain density gradients and enhanced magnetic fields that often wreak havoc with HF propagation.

November 4th - A SOLAR SECTOR BOUNDARY CROSSING. On November 6th, Earth would cross a fold in the Heliospheric current sheet, a vast wavy structure in interplanetary space separating regions of opposite magnetic polarity. This is called a "solar sector boundary crossing," and it could trigger geomagnetic activity around Earth's poles. High Frequency operators can expect poor HF propagation when the crossing occurs.



Solar wind flowing from this southern coronal hole was expected to reach Earth on November 2nd, causing magnetic unrest around the polar regions. Credit: NASA/SDO.



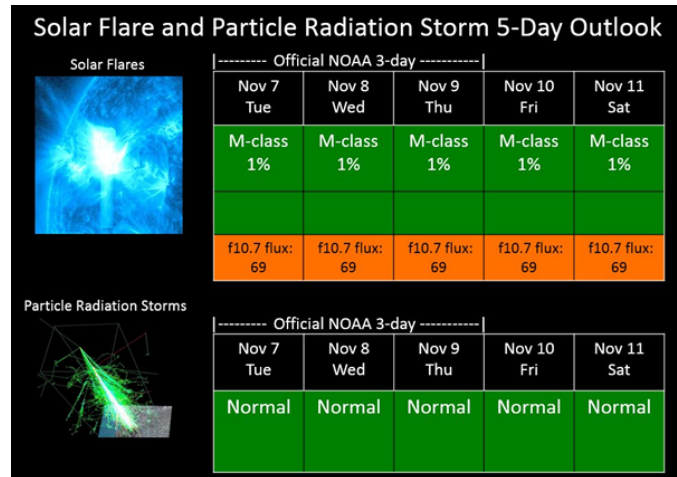
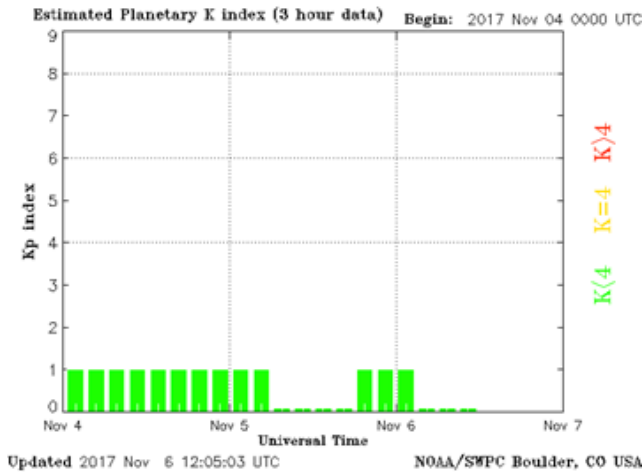
Solar wind flowing from this northern coronal hole was expected to brush against Earth's magnetic field on November 7th. Credit: SDO/AIA

**Week Two**

Earth's crossing of the heliospheric current sheet on November 6th was setting the stage for more action on November 7th. That was when a high-speed solar wind stream was expected to reach our planet. The source was a large coronal hole in the Sun's northern atmosphere. G1 geomagnetic storming was predicted.

*November 6th* - The face of the visible Solar disc was void of sunspots.

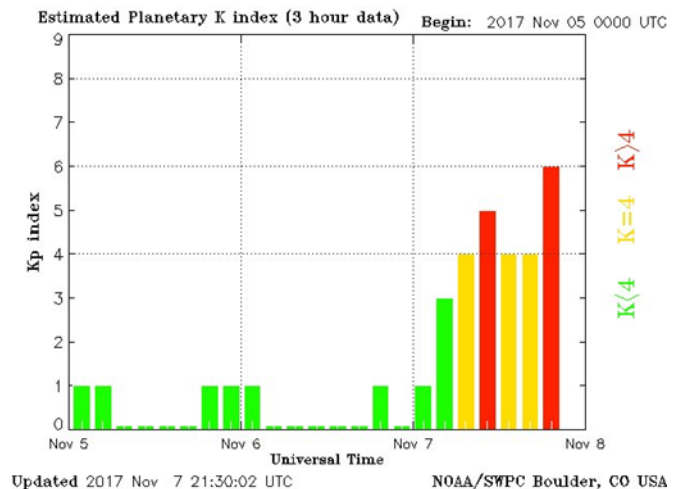
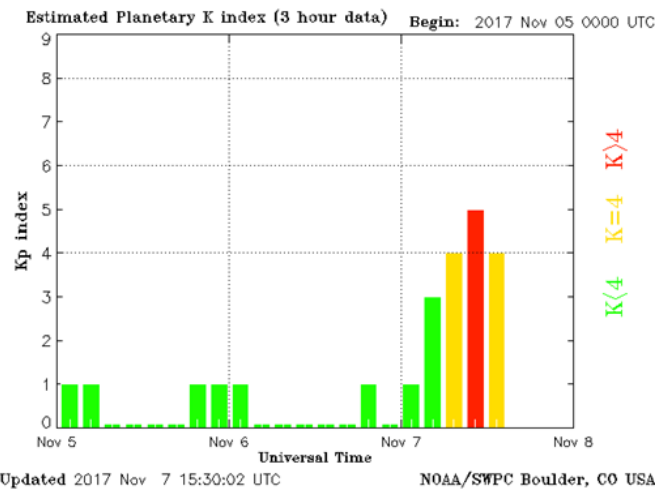
Dr. Tamitha Skov @TamithaSkov: *Flare & Solar Radiation Storm Outlook: A spotless Sun means zero flare risk, but solar flux dropped below marginal levels. Ham Radio propagation was expected to be poor.*



*November 7th* - The solar wind arrived as predicted. Earth entered a stream of fast-moving solar wind on November 7th, and this was causing G-1 class geomagnetic storms around the poles.

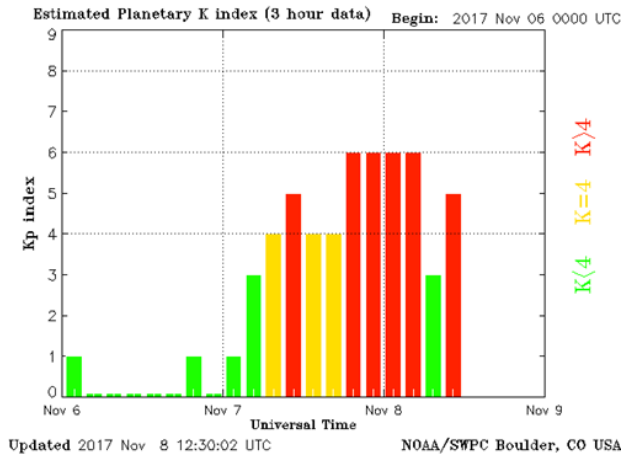
The solar wind was flowing from a wide hole in the sun's atmosphere, and Earth was predicted to be inside the gaseous stream for days. NOAA forecasters said there was a 55% to 60% chance of continued G1-storms on November 7th through 9th.

The Bz component of the interplanetary magnetic field (IMF) was pointing south as the solar wind speed gradually increased. (*Bz* - A measure of the North/South orientation of the interplanetary magnetic field measured perpendicular to the ecliptic plane. When Bz is southward, or anti-parallel to the Earth's magnetic field, geomagnetic disturbances become much more severe than when a Bz is northward.)



November 8th - Space weather forecasters predicted a minor geomagnetic storm, but it evolved into a G2 magnitude storm.

The solar wind stream hit Earth's magnetic field on November 7th. The leading edge of the stream contained a co-rotating interaction region (CIR). CIRs are transition zones between slow- and fast-moving streams of solar wind; they hold density gradients and strong magnetic fields that do an extra-good job of disrupting the HF bands.

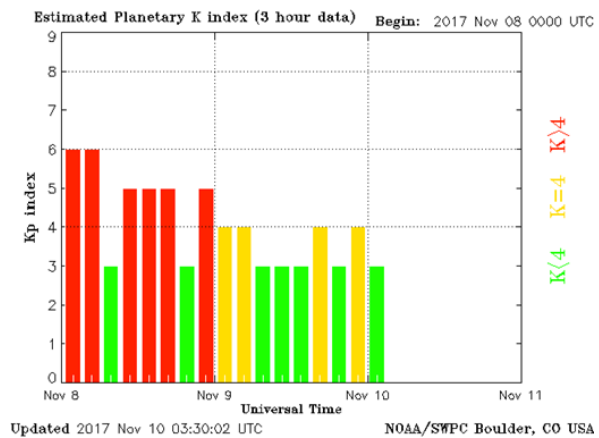
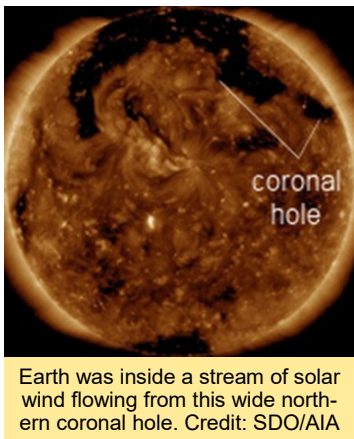


The sun was blank. No sunspots were observed.

A high speed solar wind stream was nearing 700 km/s and helping to stir up a Moderate G2 geomagnetic storm.

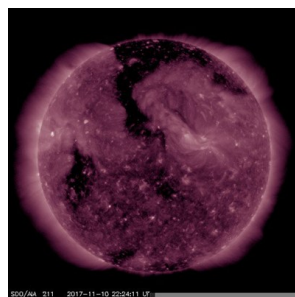
Space Weather Impacts - Communications: [https://youtu.be/7vFGTI\\_Cp6l](https://youtu.be/7vFGTI_Cp6l)

November 9th - Periods of minor, G1, geomagnetic storming continued over a 24 hour period. High speed solar wind streams were moving past our planet. The solar wind was elevated above 550 km/s and isolated periods of minor storming was still predicted during the following three days.



Exiting solar wind stream.

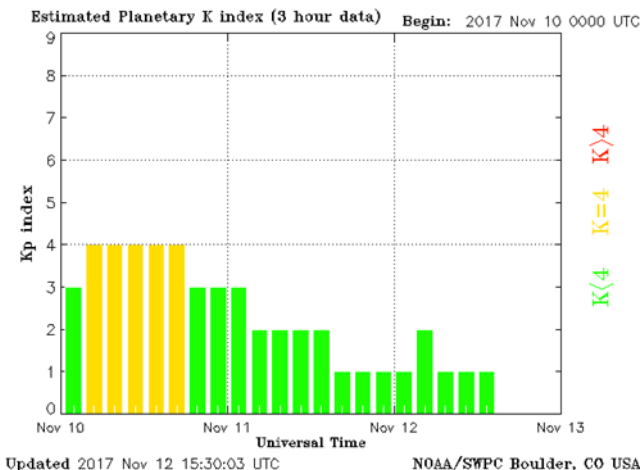
November 10th - A coronal hole was facing Earth. Enhanced solar wind was expected to arrive in about 3 days. Active geomagnetic conditions (Kp4). Threshold Reached: 14:59 UTC.



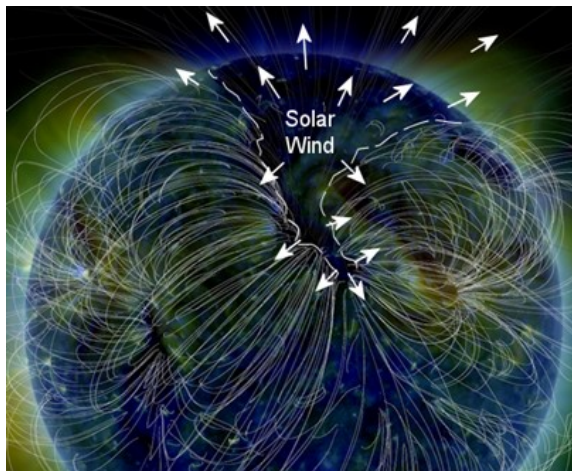
*November 11th* - EXITING THE SOLAR WIND STREAM: Earth was exiting a stream of solar wind. Interruptions in HF were only temporary, however. A new stream of solar wind was approaching Earth. Estimated time of arrival was November 14th.

A solar wind stream hit Earth, but this was no ordinary stream of gas. Its leading edge contained a co-rotating interaction region (CIR). CIRs are transition zones between slow- and fast-moving streams of solar wind; they hold density gradients and strong magnetic fields that do an extra-good job of disrupting HF propagation. The arrival of the CIR sparked a G2-class geomagnetic storm.

**Week Three**



Here Comes More Solar Wind: A wedge-shaped hole in the sun's atmosphere was opening and it was releasing solar wind. NASA's Solar Dynamics Observatory was monitoring the gap, shown here facing Earth on November 12th.

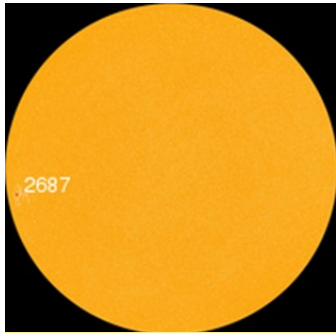


The emerging stream of gaseous material was expected to reach Earth on November 14th or 15th.

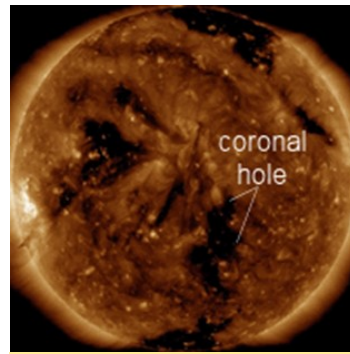
*November 15th* - WEAK IMPACT: A co-rotating interaction region (CIR) hit Earth's magnetic field on November 14th, but the impact did not cause a geomagnetic storm. CIRs are transition zones between slow- and fast-moving streams of solar wind, containing shock-wave-like gradients of solar plasma. Think of them as "Mini-CMEs" (coronal mass ejections).

**NEW SUNSPOT:** A new sunspot was emerging over the sun's eastern limb, interrupting a string of 13 spotless days.





New sunspot AR2687 had a stable magnetic field that posed no threat of strong solar flares. Credit: SDO/HMI



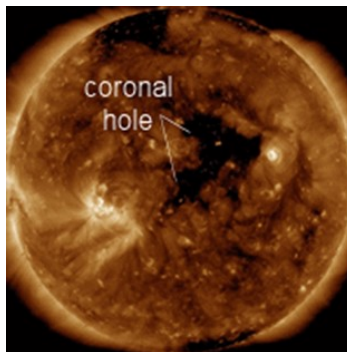
A stream of solar wind was flowing from this southern coronal hole and was expected to reach Earth on November 17-18. Credit: SDO/AIA

This sunspot was numbered AR2687. Although it had broken a long string of spotless days, AR2687 wasn't expected to alter the state of low solar flare activity. The sunspot had a stable magnetic field that posed little threat of an explosions.

Forecasts prepared jointly by the U.S. Department of Commerce, and NOAA Space Weather Prediction Center.

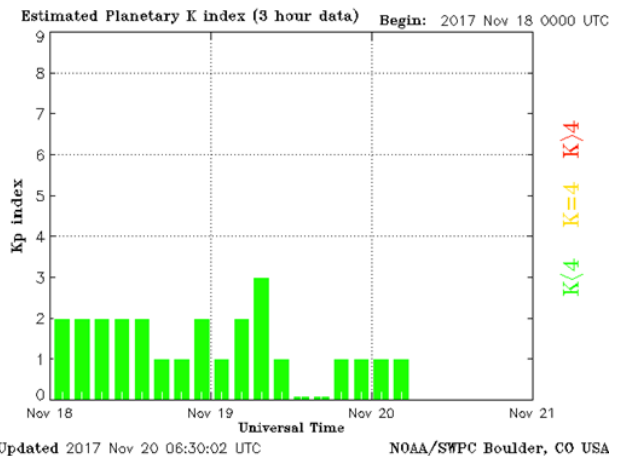
A minor G-1 geomagnetic storm watch was in effect, as an elevated solar wind stream moved past Earth. Kp5 levels were expected.

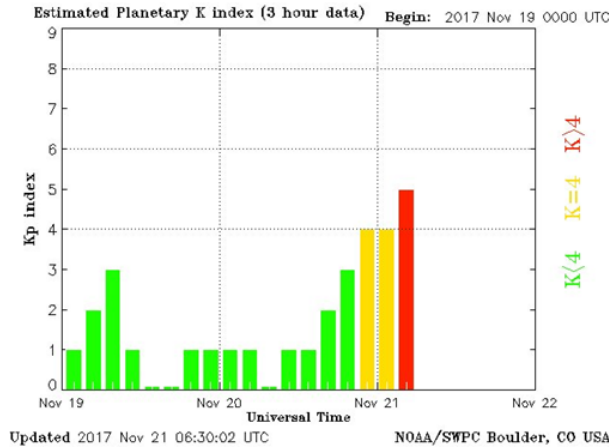
November 18th - A stream of solar wind flowing from this southern coronal hole was expected to reach Earth on November 20th. Image Credit: SDO/AIA



**Week Four**

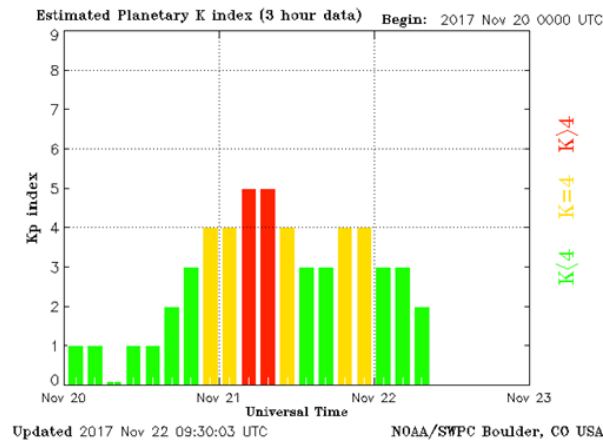
November 20th - G1 storm, (Kp=5), due to a fast, (~550 km/s) solar wind from the positive-polarity coronal hole, was in the northwestern quadrant.





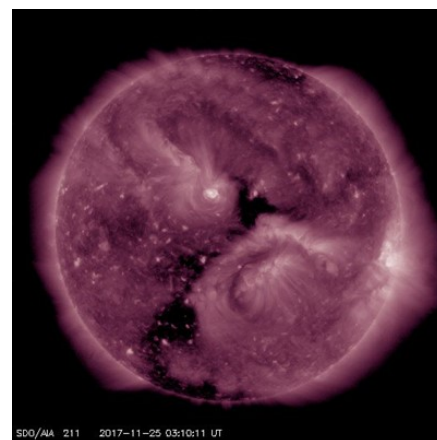
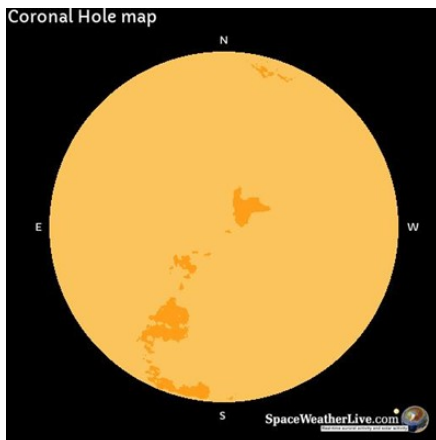
Minor Storm Observed - A high speed solar wind stream was moving past Earth above 600 km/s was helping to generate minor G1 storming.

November 22nd - EXITING THE SOLAR WIND: Earth was beginning to exit a narrow stream of solar wind that arrived only a little more than 24 hours earlier. NOAA forecasters said there was a 40% chance of G1-class geomagnetic storms on November 22nd , decreasing to 20% on November 23rd.



November 23rd - A return to Quite: A high speed solar wind stream moved past Earth and was no longer geoeffective. Geomagnetic activity was also returning to quieter levels.

November 24th - A trans-equatorial coronal hole was facing Earth. Enhanced solar wind was expected to arrive in ~3 days.



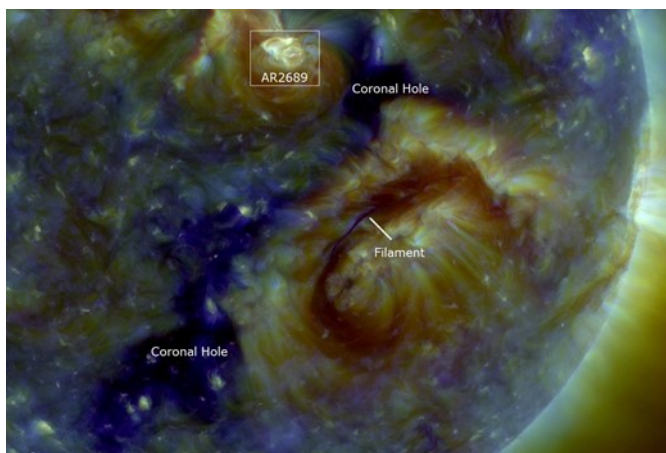
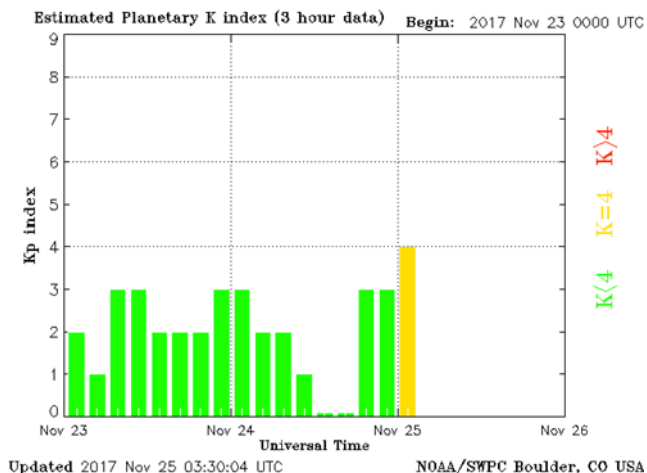
Active geomagnetic conditions (Kp4) Threshold Reached:

CHANCE OF MAGNETIC STORMS: NOAA forecasters said there was a 50% chance of G1-class geomagnetic storms on November 27th, when a narrow stream of solar wind was expected to engulf Earth.

Filament and Coronal Hole: Space weather was at very low levels, despite a very active visible disk.

A very large plasma rich filament was stretching across the southwest quadrant. The area surrounding this filament was potentially magnetically unstable, leading to a CME, should the filament erupt.

A pair of coronal holes were stretching from the northern to southern solar hemisphere and facing our planet. Solar wind streams flowing from these areas showed a potential of reaching Earth by November 27th.

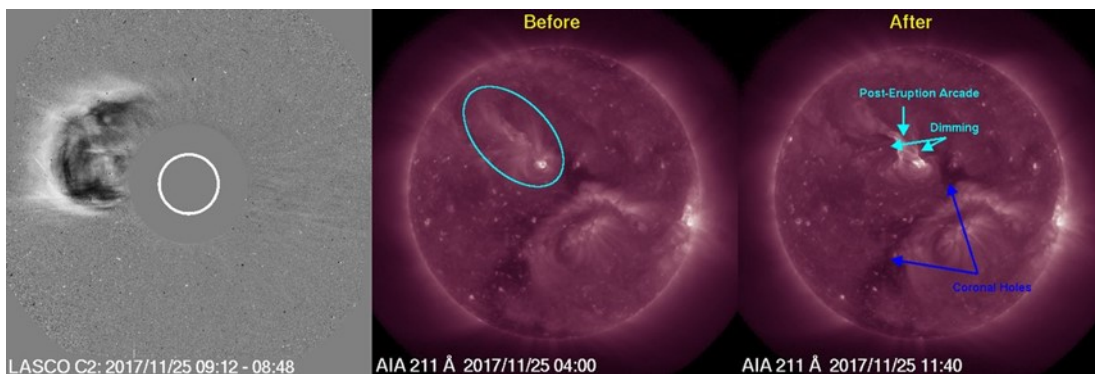


Forecast Prepared jointly by the U.S. Dept. of Commerce, NOAA, Space Weather Prediction Center. Solar activity was at very low levels. Slight growth was observed in newly numbered Region 2689.

Other activity included an eruptive filament that was observed lifting off the NE quadrant beginning at approximately 25/0445 UTC. An associated CME was observed off the east limb in SOHO/LASCO C2 imagery beginning at 25/0712 UTC. Subsequent WSA-Enlil analysis showed a potential glancing blow arriving on 29 November.

Update: An eruption from Earth-strike zone and slow (<300 km/s) CME. Looks like it was largely directed eastward (to left) due to coronal holes. But the western flank may glance us around 30 November.

73,  
AA0JK  
Fred



## The VHF/UHF Radio Horizon and the Effects of Raising an Antenna

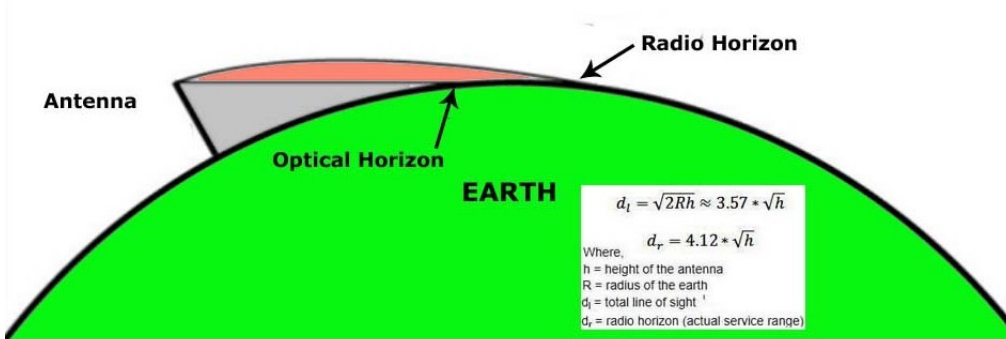
By BILL RINKER, W6OAV

Most hams at one time or another have wondered how far they can communicate on VHF/UHF and what additional coverage could be gained by raising a VHF/UHF antenna a bit higher. Well, this depends on a lot of variables. This article will provide a basic understanding of both these issues.

We often hear VHF/UHF radio frequencies referred to as "line-of-sight" propagation. In reality, the optical "line of sight" horizon (i.e. the visual horizon) is not the same as the radio horizon. Radio waves tend to bend slightly around the curvature of earth due to the "impedance" of the earth at the base of the radio wave front. This "impedance" tends to slow down the bottom of the wave front and tilts it downwards. Hence radio waves travel a bit further along the earth's surface than do optical waves.

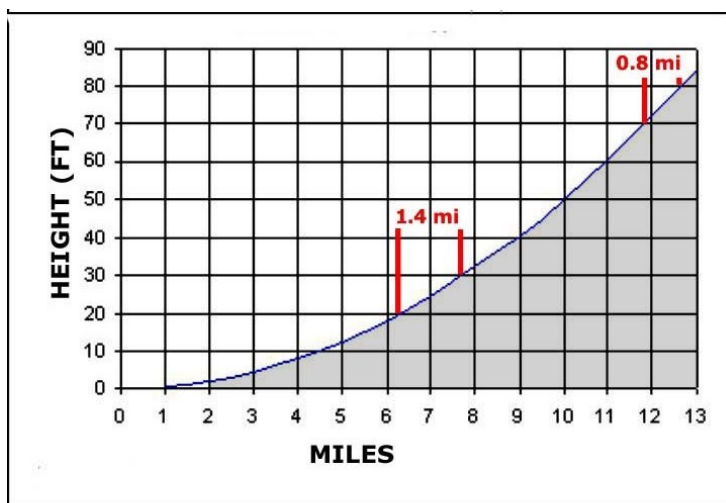
### Determining the radio horizon

Figure 1 shows the optical and radio horizons. (For those interested in math, the formulas are included in Figure 1). The radio horizon is roughly 15% further than the optical horizon. This means that if a ham is at the 50' level of a tower, he will see the optical horizon at about 8.6 miles. However, the antenna will "see" the radio horizon at about 9.4 miles. So, a ham cannot visually determine his radio horizon while on a tower. Of course there are many variables involved as very few hams live in a flat area devoid of hills, valleys, buildings, etc.



**Figure 1 - Optical vs radio horizons**

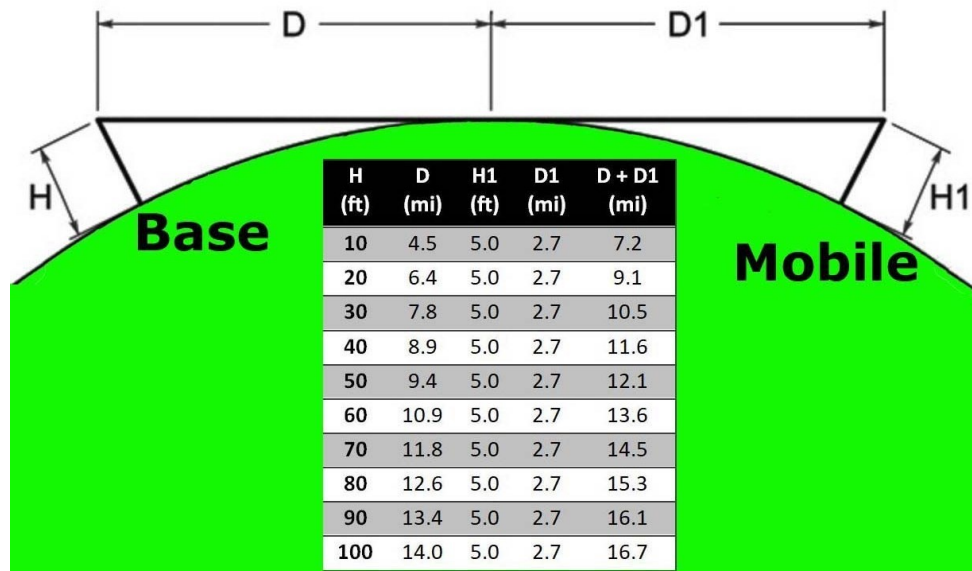
Figure 2 shows the radio horizon for antenna heights up to 90 feet over flat ground. (The red items will be discussed later). If the station is on a hill, then add the height of the hill above the surrounding flat ground to the height of the antenna above the hill. Then enter the total height into the radio horizon calculator at <https://www.everythingrf.com/rf-calculators/line-of-sight-calculator>. For example, if the antenna is 80 feet above ground on a 100 foot high hill, the antenna is considered to be 180 feet above average ground. The radio horizon would be approximately 19 miles away.



**Figure 2 - Radio horizon vs antenna height**

### Determining how far beyond the radio horizon one can work another station

The data from Figure 2 and the graphics of Figure 3 (Figure 3's chart will be discussed later) can be used to determine if you can possibly work a particular station beyond your radio horizon. To do so, determine your antenna height (H) and the remote station's antenna height (H1). (As mentioned above, if either or both antennas are on a hill, add that height to that of the antenna). Then, using Figure 2 or the radio horizon calculator mentioned above, determine your radio horizon distance (D) and the other station's radio horizon distance



**Figure 3 - Base to mobile coverage as base station antenna raised**

(D1) based on both antenna heights above average ground level. If the two stations are further apart than the sum of D + D1, you probably will not be able to communicate with the other station.

**What is gained by raising a VHF/UHF antenna?**

So, how much can be gained by raising an antenna? The linear increase in height of an antenna does not linearly increase the distance to its radio horizon. The increase in distance is non linear. Figure 2 shows the increase in the distance to the radio horizon as an antenna is raised. Note the nonlinear curve. Let’s look at two examples of raising an antenna 10 feet from two initial heights, namely from 20 feet and from 80 feet. As shown in red in Figure 2, if an antenna is raised from 20 feet to 30 feet, the radio horizon increases another 1.4 miles. If an antenna is raised from 80 feet to 90 feet, the radio horizon increases only 0.8 miles. So, it appears that there may be a point of diminishing returns relative to the cost of raising a high antenna to the higher elevations.

Let’s look at another example. The chart in Figure 3 shows what happens to the communication range between a base station and a mobile as the base station’s antenna height (H) is raised. Using the data from Figure 2 a mobile with a roof mounted antenna at approximately 5 feet has a radio horizon (D1) of approximately 2.7 miles. As the base station’s antenna height (H) increases its radio horizon (D) increases and the sum (D) + (D1) increases. As mentioned earlier, note that the communication distance (D) + (D1) increases nonlinearly as the base antenna (H) linearly rises.

In summary, there are many variables in determining a station’s radio horizon such as hills, valleys, buildings and even weather conditions. This article was meant to provide a basic understanding of optical horizons verses radio horizons, how the earth’s curve affects radio communications between stations and how raising an antenna linearly doesn’t produce a linear increase in communications distances.

ATTENTION

The DRC Board of Directors meetings are held on the 4th Wednesday of the month and are open to any member. Due to scheduling of meeting space, the board does not always meet at the same location and on occasion meetings are held via Skype. Anyone wishing to attend, please contact a board member prior to meeting night for specific information.

**DRC's HOLIDAY PARTY - CELEBRATING 100 YEARS**

ADAPTED FROM W0TX.ORG, BY BILL HESTER, NOLAJ

The 2017 DRC holiday party celebrating the DRC's 100th Anniversary is on Wednesday, December 20th at the Highlands Masonic Center (3550 North Federal Blvd, Denver). Park and enter on the south side. Doors open at 5:15 and dinner is at 6:00. There will be great fellowship, prize drawings and a presentation. There won't be any crowding this year as we have seating for 250. The dinner is catered (\$18.00/ person) and your entrée choices are rotisserie chicken or meatloaf with two sides, salad, cornbread, desert and a beverage. The dinner is by pre-paid advance reservation only, but if you don't want dinner please at least come and enjoy the fellowship and speaker. To download the form: [w0tx.org/webdev/HolidayDinnerReservationForm2017.pdf](http://w0tx.org/webdev/HolidayDinnerReservationForm2017.pdf). Reserve your spot!

**DENVER RADIO CLUB  
2017 HOLIDAY DINNER MEETING  
RESERVATION FORM**

Please print out this form, fill it in, and mail it with your check.

**THE DEADLINE TO MAIL RESERVATIONS IS DEC. 11TH, 2017 !**

(Please help us by making your reservation early. Thanks!)

Name: \_\_\_\_\_ Call: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone #: \_\_\_\_\_ E-mail: \_\_\_\_\_

Total # of Persons Attending at \$18.00 Each: \_\_\_\_\_

Entrée Choices: # of Rotisserie Chicken: \_\_\_\_\_ , # of Meatloaf: \_\_\_\_\_  
(there is only one entrée per person)

Please make your check payable to: The Denver Radio Club

My check is in the amount of: \$\_\_\_\_\_

Please mail this Reservation Form with your Check to:

Gerry Villhauer  
6511 West 74<sup>th</sup> Ave.  
Westminster, CO 80003 – 3129

Thanks for making your reservation. We appreciate your support!

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## ROUNDTABLE FEEDBACK REQUEST

BY BRENNAN PATE, AD0UZ

As we close out the DRC's 100th anniversary year, we'd like to get some feedback from Roundtable readers about the newsletter. So, I have setup a short survey at the following site: <https://www.surveymonkey.com/r/QW5JC5H>

Please go there and give your honest, anonymous feedback. We want to have a good, informative, entertaining newsletter, and need your assistance in reaching those goals. If you run into any problems with the survey please email [drc.editor@gmail.com](mailto:drc.editor@gmail.com).

Thanks!

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## ZOO PROPAGATION

BY BILL RINKER, W6OAV



**LOOKING BACK AT THE DRC, PROVIDED BY WOODY LINWOOD (W0UI)**

**July 1960 - List of local nets, WWV changes format and talk ham while borrowing money**

**NET SKEDS**

**COLORADO EMERGENCY PHONE**  
0800 Sunday—3890 kc.

**SIX METER**  
2000 Sunday and Thursday—50.3 mc.

**LCL-YL**  
0900 Monday—7235 kc.

**COLORADO STATE 2 METER**  
2130 every night—146.25 mc.

**HI NOON**  
1200 Monday-Saturday—7240 kc.

**COFFEE CLUB**  
0600 Monday-Saturday—3985 kc.  
**COLORADO WEATHER (CWYN)**  
0650 Monday-Saturday—3945 kc.

**DENVER AREA RACES**  
0900 Sunday—29.624 mc.  
1930-2000 Tues., informal (members & non-members welcome)

**SIX METER CD**  
1900 Tuesday—50.35 mc.

**ENGLEWOOD CD**  
2000 Wednesday—29.500 mc.

**COLORADO CW**  
1900 Monday-Friday—3655 kc.

**OBS (WØKQD, Irene)**  
1230 Mon., Wed., Fri.—7225 kc.

**12th REGIONAL**  
1900 every night—3570 kc.

**NEW MEXICO BRASSPOUNDERS (NMBP)**  
1900 Mon., Wed., Fri.—3570 kc.

**12th REGIONAL (TWN)**  
No. 1—1815 Mon.-Fri.—7060 kc.

(summer)  
No. 2—2000 Mon.-Sun.—3570 kc.

**BEEHIVE UTAH NET (BUN)**  
1230 Mon.-Sun.—7272 kc.

Ø—Ø—Ø

**WWV REVAMPS SIGS**

One evening in May, KØPGM got the urge to reset all clocks in his QTH (power had been off about an hour that day). So being one of the ham lot, why not "zero" in on WWV and do it up to the Nth degree. After warming up the receiver and setting in to get the 10 mc. sig., a lot of other unfamiliar sigs. seemed to appear. After checking the hearing aid for loose tubes, twisted knobs, and broken antenna wires, it was decided some yokel was trying to assist WWV or maybe practicing CW each 5 minutes.

The information was found to be this: Ten times per hour immediately following the standard 440 and 600 C.P.S. audio frequency period, (except beginning the hour), coded signal is sent out, giving split second timing information to satellite tracking stations. The regular frequencies are used alternately as before but for two minutes instead of three. This is an experimental gesture toward World Wide Time observations, and helps satellite tracking stations get an extremely accurate "fix" on their subject. It's a WWV time signal of course (from near Washington, D. C.), however, it is controlled by the master atomic clock of the Boulder, Colo. Laboratories, the NBS reports.

Oh, yes.

The signal identifies the day, hour, minute, and second, also the accuracy of the transmitter which is better than one-thousandth of a second as reported by the bureau.

How close is yours?

**Need CASH or  
SMALLER  
MONTHLY PAYMENTS?**



R. J. "ROG" ROGERS  
WØNNI

HERE'S a place you can talk ham radio or learn how to work Asia on 10 watts while you make your payments! I make personal loans or do any kind of financing in amounts of \$30 to \$3000, or more. Just phone me at RAce 2-2847.

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73 South Broadway  
Just South of J. C. Penney



**Ham Word Search & Rescue**

(The solution is on the next page.)

E E E E X A M E P R E H R N T  
 R E W O T A L O R E R K E O O  
 T V T W A B W R I Z I I M I O  
 E J O E A E C R E Y R I R T T  
 E L B I R A R R A L E K O A R  
 F W R O Y E R L R A L I G G T  
 O A H E R C H R X N P M F I T  
 V K L A N R N P R A P I O V T  
 E E C A A R I E S I O E T A D  
 M E W E A R E W U O D G O N A  
 C E F A H A A N V Q N I O O O  
 O E E A B C I R E I E O O I L  
 M E A R O S I N X Z I R I D T  
 M S E L E C T I V I T Y F A T  
 E A E O T R M B R I E R O R T

**Word List:**

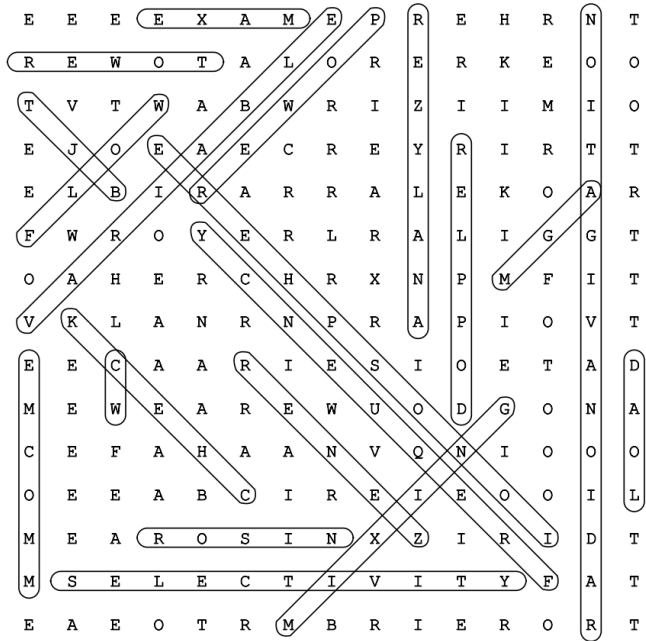
- |             |           |                 |       |
|-------------|-----------|-----------------|-------|
| AGM         | ANALYZER  | BJT             | CHECK |
| CW          | DOPPLER   | EMCOMM          | EXAM  |
| FLOW        | FREQUENCY | IONOSPHERE      | LOAD  |
| MIXING      | POWER     | RADIONAVIGATION | ROSIN |
| SELECTIVITY | TOWER     | VARIABLE        | ZENER |

**FACT OF THE DAY**

**Broken Safety Grounds**

Electric power outlet safety grounds (also called equipment grounds) generally return to a main power panel and then connect to a large-gauge ground wire that is clamped to an incoming water pipe. Home owners often install various types of water treatment devices such as water softeners, mechanical filters, reverse osmosis filters, electromagnetic water conditioners, or magnetic water conditioners after original home construction and wiring. Sometimes those devices are installed in a main water line between the power panel ground-point and water pipe entrance. Some water filters have plastic pipe couplers or plastic pipes that break the electrical ground circuit. In those cases, the ground wire either should be reconnected to the street-side of the filter or the filter should be bridged with a large-gauge electrical conductor.

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**HAM SITE OF THE MONTH**  
[DRC's Holiday Dinner Reservation Form](#)

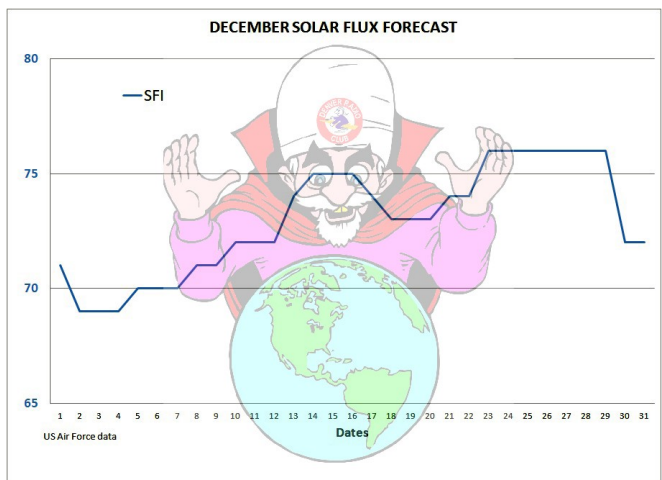
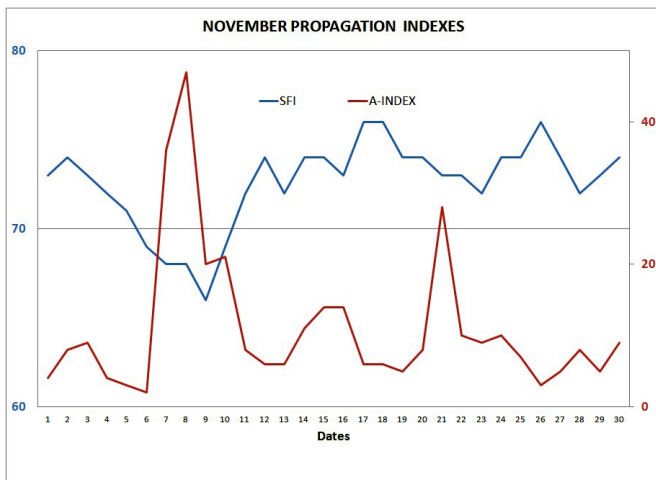
**THE ROUNDTABLE ARCHIVE**  
 Go to: <http://www.wotx.org/roundtables.htm>  
**THE ROUNDTABLE ARTICLE INDEX**  
 Go to: <http://www.w0tx.org/RoundtableArchive/-RoundTables-Index.pdf>

**PAST & FUTURE PROPAGATION CONDITIONS**

By Bill Rinker, W6OAV

The charts below show the Solar Flux and "A" indexes for last month and the forecast for this month's Solar Flux index.

Refer to the September 2010 *Roundtable* for more complete information on interpreting these charts. Issues of the *RoundTable* are available at [http://www.w0tx.org/RoundtableArchive/2010-RoundTables/RT201009\(SEP\).pdf](http://www.w0tx.org/RoundtableArchive/2010-RoundTables/RT201009(SEP).pdf)



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**UPCOMING EVENTS**  
**HAMFESTS & CONVENTIONS**

Event	Date	Location	Sponsor Website
Winter Hamfest 2018	01/20/18	Larimer County Fairgrounds - Thomas McKee 4H Building	<a href="#">Northern CO ARC</a>

**UPCOMING ARRL CONTESTS & EVENTS**     [ARRL CONTEST CALENDAR](#)

Contest	Start Date	Start Time	End Date	Stop Time	Notes
160 Meter	12/01/17	2200 UTC	11/03/17	1600 UTC	
10 Meter	12/09/17	0000 UTC	12/10/17	2359 UTC	
Rookie Roundup - CW	12/17/17	1800 UTC	12/17/17	2359 UTC	

**UPCOMING QSO PARTIES**

*The following are the Contests not sponsored by the ARRL. Please submit additions for future issues.*

State/Province	Start Date	End Date	Sponsor Website	Notes
Montana	01/27/2018	01/28/2018	<a href="#">Flathead Valley Amateur Radio Club</a>	Based on 2017 date.
British Columbia	02/03/2018	02/04/2018	<a href="#">Orca DX and Contest Club</a>	
Vermont	02/03/2018	02/04/2018	<a href="#">Radio Amateurs of Northern Vermont</a>	Based on 2017 date.
Minnesota	02/03/2018	02/03/2018	<a href="#">Minnesota Wireless Association</a>	
South Carolina	02/24/2018	02/25/2018	<a href="#">Columbia Amateur Radio Club</a>	
North Carolina	02/25/2018	02/26/2018	<a href="#">Raleigh Amateur Radio Society</a>	Based on 2017 date.
Idaho	03/10/2018	03/11/2018	<a href="#">Idaho QSO Party</a>	

ATTENTION

SUPPORT THE DRC FROM YOUR AMAZON PURCHASES

You can now support your Denver Radio Club when you make purchases from Amazon.com. Amazon Smile donates 0.5% of your purchase to the non-profit (501.c.3) organization of your choice. This is at no additional cost to you. To support the DRC just visit [smileamazon.com](http://smileamazon.com). Select Denver Radio Club, Inc. as the organization you want to support and proceed with your order as usual. Amazon Smile will credit the DRC automatically. Thank you for your support.

**DRC REPEATERS**

BAND	Freq / Shift / PL Tone	Additional Information
6m	53.090MHz (-1MHz) 107.2Hz PL	
Packet	145.05MHz<>14.105MHz	2 meter / 20 meter gateway. Useable by Technicians on 2 meters. See January 2015 RT.
2m	145.490MHz (-) 100Hz PL	Linked to the 70cm / 448.625MHz machine.
2m	147.330MHz (+) 100Hz PL	Local area. Has voting receivers. Does not TX a PL.
2m	147.330MHz (+) 131.8Hz PL	Test mode operation. Send signal reports to Tech Committee.
1.25m	224.380MHz (-) 100Hz PL	
70cm	447.825MHz (-) DCS~073; NB 12.5; +/- 2.5	Saint Anthony's. Note: This is a narrow band repeater requiring DCS.
70cm	448.625MHz (-) 100Hz PL	Linked to the 2m / 145.490MHz machine.
70cm	449.350MHz (-) 100Hz PL	Wide area coverage with Echolink, node # 4140.
70cm	449.775 MHz (-) 100Hz PL	Yaesu Fusion Digital, Wires-X and analog. 100 Hz tone required for analog.
70cm	446.7875MHz (-)	BrandMeister Repeater: Slot 1 – Wide Area Traffic, Slot 2 – Local Talk Group 310804



***HRO 12 STORE BUYING POWER WORKS FOR YOU!!***









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**e-mail: denver@hamradio.com**

<b>DECEMBER 2017</b> <span style="float: right; color: red;">DRC Net Sundays at 8:30 p.m. on 145.490 / 448.625 (no PL)</span>						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					<b>1</b> <b>160 Meter</b> - Begins 2200 UTC	<b>2</b>
<b>3</b> <b>160 Meter</b> - Ends 1600 UTC   Full Moon	<b>4</b>	<b>5</b>	<b>6</b> <b>Learning Net</b> 7:30 p.m. 145.490 / 448.625 (No PL)	<b>7</b>	<b>8</b>	<b>9</b> <b>10 Meter</b> - Begins 2200 UTC
<b>10</b> <b>10 Meter</b> - Ends 2359 UTC   Last Quarter	<b>11</b>	<b>12</b>	<b>13</b> <b>Learning Net</b> 7:30 p.m. 145.490 / 448.625 (No PL)  	<b>14</b>	<b>15</b> <b>10GHz &amp; Up</b> - Ends 2359 UTC	<b>16</b>
<b>17</b> <b>Rookie Roundup - CW</b> - Begins 1800 UTC thru 2359 UTC  	<b>18</b>   New Moon	<b>19</b>	<b>20</b> <b>DRC Holiday Dinner</b> Doors Open 5:15 Dinner 6 PM	<b>21</b>	<b>22</b>	<b>23</b>
 <b>31</b>		<b>26</b>   First Quarter	<b>27</b> <b>Learning Net</b> 7:30 p.m. 145.490 / 448.625 (No PL)	<b>28</b>	<b>29</b>	<b>30</b>

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VE Team	KC2CAG	Tom Kocialski	720-284-1911	<a href="mailto:kc2cag@arrl.net">kc2cag@arrl.net</a>
Web Master	N0LAJ	Bill Hester	<i>Check Roster</i>	<i>Check Roster</i>

**Please Let Us Know**

Over the years we occasionally hear from hams who have read the RoundTable in other states and countries around the world. We appreciate the comments and we would like to know where you are located. So if you live outside the Front Range or Denver Metro Area and read the newsletter either online, email or hard copy please send a short note via email with your *City, State or City, Country*.

We will publish it at a later date in our new regular feature called RoundTable RoundWorld.

To respond to this request send your information to [drc.editor@gmail.com](mailto:drc.editor@gmail.com).

*Subject: I'm located in...*

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*DRC members - this is your newsletter. Please email your club or amateur radio related suggestions to the editor. Members are the heart of The Denver Radio Club, so 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.editor@gmail.com](mailto:drc.editor@gmail.com). The submission deadline is the 20th of the Month. ~ Editor*