# ROUNDTABLE

The Denver Radio Club Newsletter

**Since 1917** *100 years of amateur radio in Colorado* **June 2017**


## President's Message

By Gerry Villhauer, W0GV

Hello DRC Members,

What crazy weather lately. Since many of our members live in the Lakewood area that was hard hit by the hail storm, I hope you are recovering and had minimal damage. We were lucky in my neighborhood, having only dime size hail and the only damage I sustained, as far as I know, one of the cups was broken on my weather station. Cathy and I had the pleasure of traveling to Hamvention 2017 at the new venue in Xenia, Ohio. I think the committee did a great job for the first year in a new location. All the inside vendors were spread out in several buildings and tents, which made it a challenge finding particular vendors that you were interested in visiting. It rains a lot in Ohio which made going from building to building a wet experience at times. The flea market was HUGE! The bad thing, with all the rain, it turned into a Giant Mud Hole. All in all, it was good and we would go again if the opportunity should arise.

As I reported last month, our tech team completed the installation of the new antenna for the move of our DMR repeater to Centennial Cone. As planned, on May 13 the repeater was relocated to its new mountain top home. All went well and we are getting good reports from members as far east as Elizabeth for hand held coverage. As the guy on the old TV show, The A Team used to say "It is good when a plan comes together". Thank You to our Tech Team for a job well done. Finally, we would appreciate reports from our DMR Brandmeister users on your experience using the system at the new location.

Our program last month on JT65 and JT9 digital HF modes was well received and generated a lot of interest and questions. We thank Bill Thomas (WB9KPT) for a well presented and informative program.

Mark your calendars for June 21st which is our next meeting date. We have another interesting program in store on Mesh Networking in the ham bands. Jeremiah Bagula (N0KMO) and Brad Ramsey (K0BJR) will be covering technologies used along with what radios are available. Mesh networking has many applications especially in emergency communications where the mesh network handles traffic on a ham supported network; not dependent on the internet, but internet access can be provided if needed for example through a media like Winlink. This is very interesting technology; please don't miss the opportunity to learn about it at our next meeting.

Thanks to all of you who recently joined and made the DRC "Your Club". Please stay active on the air, come to meetings, programs and events. Your name and call will be listed in the body of the Roundtable.

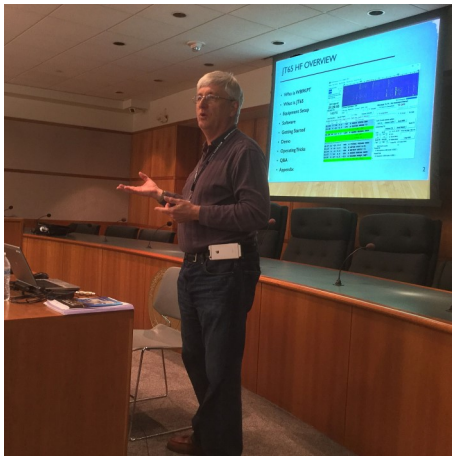
73 for now,

Gerry (W0GV)
President

## Inside This Issue

## May Meeting – What'd I Miss?

By Bill Rinker, W6OAV




There were 55 attendees. After Dave Gillespie (K0HTX) began the meeting with introductions, he gave an overview of our upcoming Field Day. It appears that we'll have access to the same site as last year. Jim Beall (K0TOR) then gave a report on the siren test and thanked all the participants. Next year Wheat Ridge and Lakewood will not simultaneously conduct their tests as they did this year.

The meeting was then turned over to Bill Thomas (WB9KPT) who introduced himself. Bill was licensed in 1965 and is the author of the 1976 QST article "Meet the Microprocessor." He then began his presentation on JT65/JT9 with which he has made over 1000 contacts. Bill provided a very detailed description of structure and functioning of JT65 and followed this with a detailed description of the required hardware and software. From there he described how to get started, how to generate QSOs and provided creative operating tips. Bill presented many valuable references for helper software, interface information and many other important websites. Bill then ended the presentation with a video of a JT65 contact he had made with an eastern station on 40 meters. After the meeting several attendees were heard to say that they were going to try JT65.

## May Meeting Follow-Up

Adapted from a note by Roger Hassell, AD0WG

Regarding the JT65 presentation at the May meeting: in the presentation Bill suggested that we not assume a band is dead just because we hear no activity, especially on the JT windows, and that we should try calling CQ. I certainly agree with that sentiment, and I often try calling CQ on bands that appear to be otherwise dead. Still, I was very surprised by the response when I called CQ last night at ~3:45 UTC on 17m, after the meeting. It was completely dead even and odd. I called CQ and VK7XX in Tasmania responded, with a -01 sig, and reported my -03 sig. The PSKReports website showed very little activity otherwise.

## 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:

| | | | |
|---|---|---|---|
| Amy Kemm - KE0NKN | Jeff Deaton - KE0KPS | Daniel Osborn - W0BBR | Paul Meenach - KD0CXX |
| Gabriel Kemm - KE0MYF | Jerrad Thramer - KD0HVX | Marco Vasquez - KB0FPS | |

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.

## Technical Committee Report

By Bill Rinker, W6OAV

The following is an overview of the subjects discussed at the May Technical Committee meeting. The project coordinators' call signs are in red.

**DRC BrandMeister Move (K0HTX)**
Goal: Move the BrandMeister repeater to Centennial Cone to provide better coverage.
Status: The repeater has been relocated and is working well. This item will be removed from the project list.

**AllStar Link Voter System (W0GV)**
Goal: Establish an AllStar Link Voter network on 147.33.
Status: Four remote receiver sites are now on line and working well. The Tech Committee is requesting reports if any issues occur.

**AllStar Link Voter System (W0GV)**
Goal: Locate possible remote sites.
Status: W0GV is looking for additional possible sites. W6OAV will develop propagation coverage maps to determine if the possible sites will fill in the 147.33 transmitter's "dead spots".

**DRC/TSA Aurora Site (WW0LF)**
Goal: Maintain contact with TSA relative to establishing a "communications room" for the DRC.
Status: Several club members met with a TSA rep and inventoried the club's equipment. WW0LF is adding the equipment to the club's inventory list.

**Fusion Repeater Upgrade (AC0UA)**
Goal: Equip the Fusion repeater with a Wires-X Link unit to connect it to the Wires network.
Status: AC0UA has installed the Wires X interface at Station 4. The repeater is now connected to the Fusion network. The Tech Committee is requesting any reports if issues are found.

**Station 4 Remote Power Control (K0HTX)**
Goal: Investigate purchasing and installing Internet controlled power outlets.
Status: K0HTX will determine which pieces of equipment need remote power control and determine the best unit(s) to purchase.

*~ Editor's Note: The Technical Committee meeting is open to members of the DRC. It is held in the Arvada room, starting at 6:00 p.m. on the evening of the DRC monthly meeting.*

## June Meeting Announcement

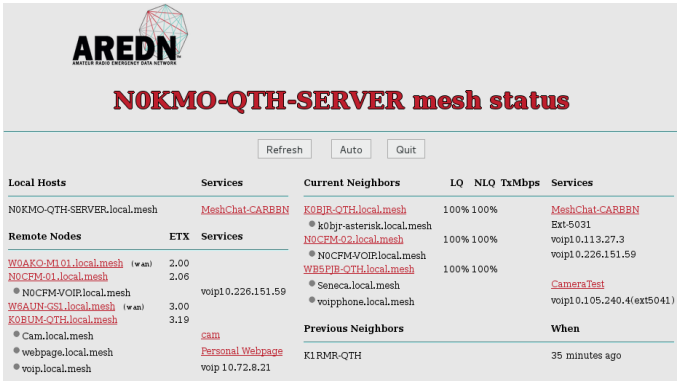
By Jeremiah Bagula, N0KMO

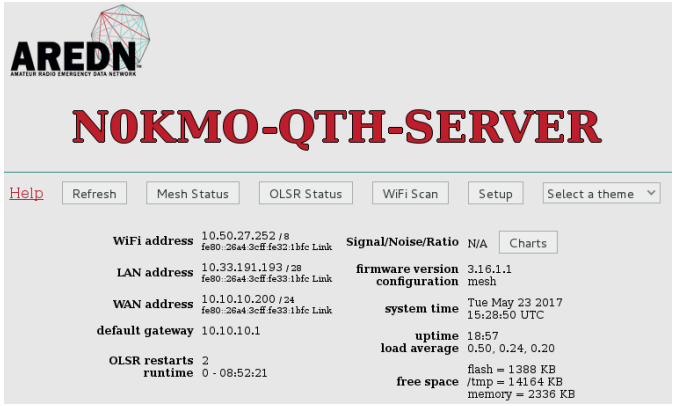
Want to learn about ham Mesh Networking? If so, plan to attend the June club meeting.

CARBBN will be presenting information on Mesh networking in the Ham bands. The presentation will cover technologies used along with what radios are the solution to a lot of issues. Other topics will include what services can be used on the mesh network and how applications will act, along with a discussion on how CARBBN is trying to keep everything Part 97 compliant.

Presenters' BIOs:
Jeremiah Bagula (N0KMO) is a software / system engineer with over 20 years of varied experience building networked systems. Early in his education Jeremiah moved from Computer and Electrical engineering to Information Technology which allowed him to expand his knowledge from base electronics into more of development of full computerized systems. Jeremiah started his radio career with Radio Shack by learning about the radio uses in the local area by programming scanners, along with selling local Hams radio equipment including radios, antennas, feed lines and various other parts. Jeremiah became a ham in 2016 and holds an Amateur Extra Class license.

Brad Ramsey (K0BJR) is an electronics engineer with over 25 years of experience in RF measurements, transceiver design, and digital processing. Brad began his career with the Boulder Laboratories of NTIA, the agency that regulates U.S. government radio spectrum. In his current position he is a systems engineer for a signal processing group. Brad became a ham in 2016 and holds an Amateur Extra class license.



## EmComm Note

By Brennan Pate, AD0UZ

On May 10th, the DRC completed another successful siren test. This year was a double-duty event because Lakewood and Wheat Ridge combined their tests. This meant we had to cover a total of 42 different sites. To cover them we had 46 monitors, 4 rovers and 3 at net control. Thanks goes out to the following Hams:

| | | | | |
|---|---|---|---|---|
| KB0UQT | Kelly | | KD0KVJ | Glen |
| KB0USF | Don | | K0YES | Ken |
| N0BED | Jim | | KA0BBQ | Barry |
| KA5DKS | Ken | | KE0CNS | Kenny |
| KE0CNP | Ed | | KU5X | Michael |
| KC0CZ | Bob | | AD0GX | Kevin |
| KE0CNU | Tony | | WG0N | Dave |
| KC2CAG | Tom | | VE2WKR | Luca |
| N5CMK | Greg | | KD0NRO | Reid |
| AA0JK | Fred | | KD0SYD | Barbara |
| KD0WMO | Steve | | KD0YBD | Bruce |
| AD0WB | Mike | | W4PRG | Newell |
| AA0DH | Dave | | KE0EUS | Rita |
| N4ATA | Doug | | KE0LPR | Nate |
| WB0HWP | Ron | | K0DTF | Don |
| KD0DUJ | Chris | | K0NNN | Dave |
| K0HRT | Ron | | WZ0S | Bill |
| W6OAV | Bill | | N0PQV | Terry |
| KC9RWM | Jessiah | | WW0LF | Orlen |
| WY0J | Jan | | G7LWN | Vince |
| N0BVR | JD | | KJ6BIT | Tom |
| K0DES | Dave | | KD9AUK | Darryl |
| KD0YMG | Jed | | N0CFM | Robert |
| AC0T | Wally | | K0HTX | Dave |
| KE0AVK | Dick | | K0LAI | Larry |
| K0TOR | Jim | | AE5IT | Chris |

We were very pleased with the check-in process and had everyone checked-in in plenty of time. The officials threw a curve ball at the last minute when they told us the test would be done in 3 phases. First, Wheat Ridge sirens would be run, then Lakewood and then a third test with undisclosed parameters. Jim (K0TOR) ran the formal net and Kevin (AD0GX) announced when each phase was completed and the next was starting. After it was all said and done, the third phase was not actually an audible test. The officials had sent out a test signal to each siren but they had turned them off, effectively testing to confirm their programming was correct and that none of them would run.

After the test Jim continued the net and had the observers radio in their results. Then, many of the participants joined up at the Lakewood Public Safety building for pizza and drinks.

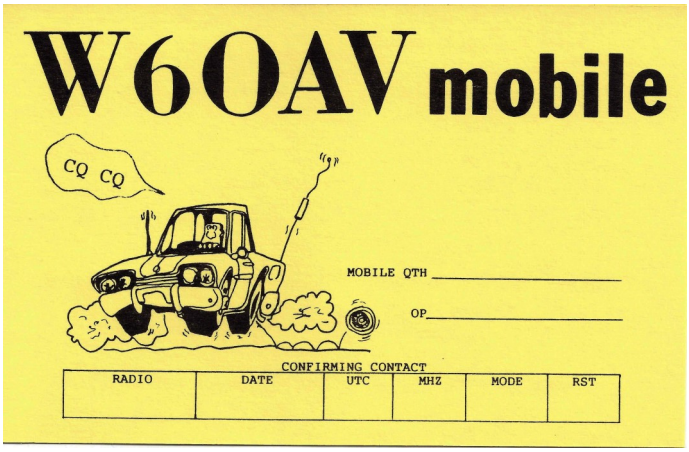
We appreciate everyone's participation. If you would be interested in helping with next year's tests then keep on the lookout for information starting in March. The 2018 tests are supposed to be on different days, as they have been in the past. We welcome anyone who would like to participate, regardless of whether you have helped with a test in the past, or not. It's a good opportunity to put your amateur radio skills to the test, help our law enforcement officials, help the general public and save the taxpayers some money.

Finally, for those who participated in this year's test, I would appreciate it if you would send over any feedback you have about this year's test, so that we can improve future tests. Please email: emcomm@w0tx.org.

## Calling all QSLs...

By Brennan Pate, AD0UZ

This month's QSL card was provided by Bill (W6OAV). It's his mobile QSL card:




If you would like to have your QSL card featured in an upcoming edition of the Roundtable please send a copy of it (PDF or JPG, etc.) to drc.editor@gmail.com.

Alternatively, if you have received a unusual or exotic one in the past and would like to share it, then send it on over.

## Learning Net Report

By Fred Hart, AA0JK

Thanks goes out to our net controllers: Larry (K0LAI), Alex (W2PBR), and Steve (KD0WMO).

Topics discussed this past month:

The Alpha EZ Military Antenna For 6-80 Meters: https://youtu.be/Qie3ynllJ3c. It is a great antenna for those that live in an HOA community, apartment and condos. Easy setup for emergency deployment and field day use.

DIY How To Build A Solar Powered Radio Communications Go Box - The Ham-O-Can: https://youtu.be/vr_rGJ8Rq5c

How To Program The Baofeng UV-5R, Tin Hat Ranch: https://youtu.be/0mzY5vlH718

How I learned Morse code fast and easy: https://www.youtube.com/watch?v=Jls-PiR-dBI (Thanks Larry K0LAI)

W1AW Code Practice MP3 Files: http://www.arrl.org/Code-Practice-Files

Increase Your Code Speed using Wordsworth: K1IG, George Allison, QST, May 2017, Page 74

W5CYF "My First CW Contact": https://youtu.be/shUOUE-JUiU

Crank-up / Telescopic antenna towers: Portable Pneumatic Masts: http://www.totalmastsolutions.com/telescopic-mast-systems/portable-pneumatic-masts/portable-pneumatic-masts/

JT65-HF Digital Mode and software: K0LAI Larry

MFJ Cob-Web Antennas: K6HJV Tom

Comet HH-22 Antennas: MFJ-1775 Dipole Antennas KE0LKH Matt

Code Trainer: KD0YMG Jed

Round table comments on new radios out and upcoming new Ham gear.

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 amateurs 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 for detailed information: Mike Vespoli (KE0HFH) and Brennan Pate (AD0UZ), at 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 or 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 in-

*(Continued on page 6)*

put 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,

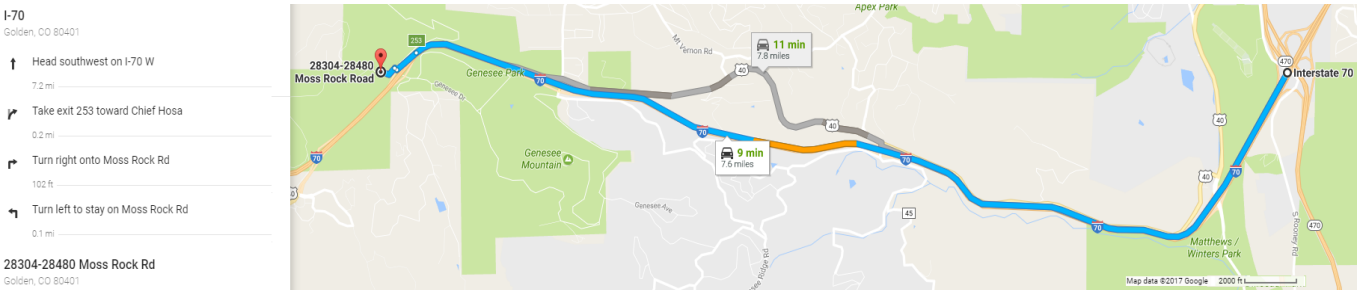
AA0JK
Fred

## Field Day 2017

Provided By Jason Smallwood, AC0UA

Denver Radio Club is proud to again have Field Day at Chief Hosa, and everyone is invited. We reserved part of the campground. You can camp with us or come up for the day. Contact Jason (AC0UA) at sjason67@msn.com or via 303-907-1528, if you need a camp spot at Chief Hosa.

ARRL Field Day is the most popular on-the-air event held annually in the US and Canada. On the fourth weekend of June (24th and 25th), more than 35,000 radio amateurs gather with their clubs, groups or simply with friends to operate from remote locations. The goal is to work as many stations as possible on any and all amateur bands (excluding the 60, 30, 17, and 12-meter bands) and to learn how to operate in abnormal situations and in less than optimal conditions. Field Day is open to all amateurs in the areas covered by the ARRL/RAC Field Organizations and countries within IARU Region 2. DX stations residing in other regions may be contacted for credit, but are not eligible to submit entries.




## W0TX Connect Systems BrandMeister Code Plug

By Tom Kocialski, KC2CAG

A revised version (March 12, 2017) of the Rocky Mountain Ham code plug, with all known 56,380 DMR-MARC contacts included, has been uploaded to: w0tx.org/brandmeisterDRC.htm. Two new zones were added to the RMHAM Code Plug: A W0TX Zone and a GMRS 1-8 Zone. The W0TX Zone has W0TX Brandmeister channels: Local, Colorado, Mtn West, Parrot, T310, TS1 Unlink, USA and Worldwide and also includes analog channels 448.525 and 449.350 (repeaters) and 446.000 simplex. It also has an added GMRS zone with GMRS channels 1 -8. Two new scan lists were created, a W0TX scan list containing all the channels in the W0TX Zone and a GMRS scan list containing the 8 GMRS channels in the GMRS Zone. The new W0TX zone is set as the startup zone.

1.) Save the Code Plug to a folder.
2.) Open up the Connect Systems CPS software.
3.) Click “File” and then click “Open” the saved Code Plug.
4.) Click “General Settings”.
5.) Enter your DMR Marc Radio ID, Radio Alias (e.g. your callsign), and Power On Message Line 2. (e.g. the Code Plug name, so you can easily identify which code plug you are currently using)
6.) Save the Code Plug.

*Continued from page 6)*

7.) Connect the CS-750 to your computer with the programming cable and turn it on.
8.) Click “Program” and then “Write to Radio”. (With 56,000+ contacts, this takes some time.)
9.) When the writing is finished, your CS-750 will restart with the new code plug and the W0TX zone selected at startup.

Notes:
This code plug replaces the original Digital Contact "Local" Call ID of 2 with a new Digital Contact "Local" Call ID of 310804 for W0TX. This Call ID allows remote users employing a DMR Hotspot, such as a SharkRF OpenSpot or DVMega, to directly connect to the repeater on this talk group. Since Talk Group 310804 is statically programmed on Time Slot 2, local users monitoring this talk group will hear any incoming remote calls.

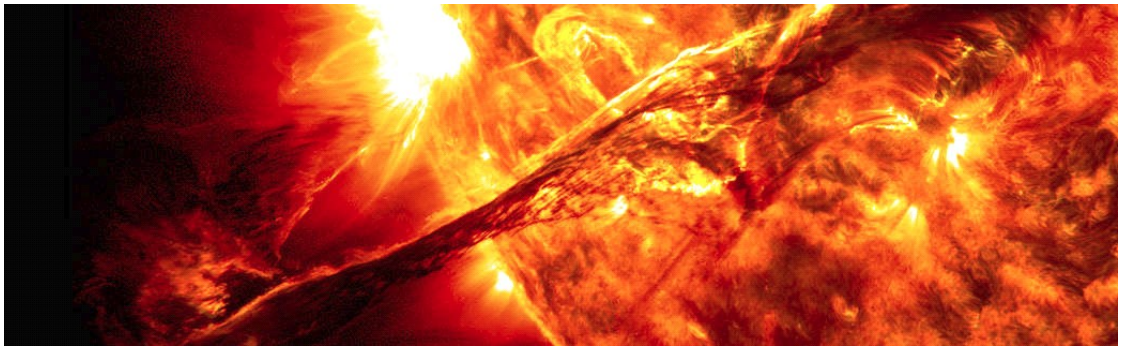
It is strongly recommended that you use the most recent Connect Systems CPS version 4.00.42. You MUST USE radio firmware that supports 65,536 contacts. Firmware version 3.00.14 is recommended. Find them at: http://www.connectsystems.com/software/software%20CS750.htm

Many thanks to the folks at Rocky Mountain Ham Radio for creating the sample code plugs!!!

Tom, KC2CAG

## Solar Update

Provided By Fred Hart, AA0JK



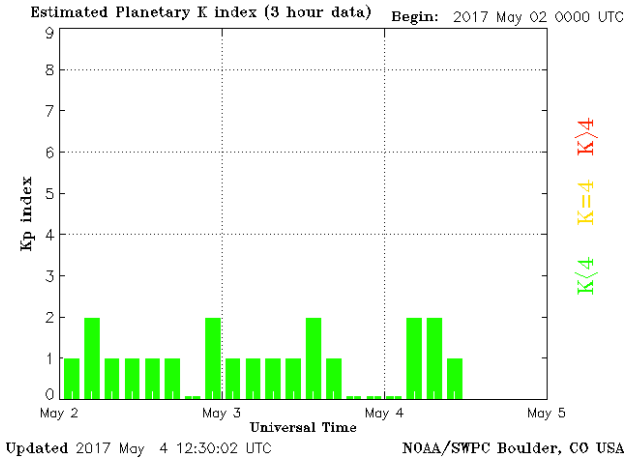
“Solar Geophysical Activity Report “

**Week One**

**MAGNETIC STORM POSSIBLE WEEK ONE:** A filament of magnetism on the sun exploded on April 30th , hurling a CME into space. NOAA analysts say the cloud could potentially deliver a glancing blow to Earth's magnetic field on May 3rd with an expected 40% chance of ensuing minor geomagnetic storms.

There were 3 numbered sunspot regions on the disk. Sunspots had stable magnetic fields that posed no threat of strong solar flares. There were no large coronal holes on the Earth facing side of the sun.

Solar activity was expected to be very low with a slight chance for a C-class flares, 01 May, 02 May, 03 May.

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AR 12654 was growing substantially over the previous 30 hours with sunspots. This region was expected to be exciting as it enters Earths strike zone.

Almost a C-class (B9.9) flared from a quiescent region NE of AR 12651, as material was ejected in a narrow corridor, as the adjacent corona oscillated. https://twitter.com/halocme

The Activity is all Backside: Solar Storm Forecast 05-04-2017

Tamitha Skov: https://youtu.be/aFYLtfq7neg

The Sun naps this week as all the activity turns to its backside. We had a near miss from a solar storm that was grazing Earth to the west, but it looked to be causing only minor disturbance. Space Weather was expected to remain quiet for the remainder of the week.

*May 5th*

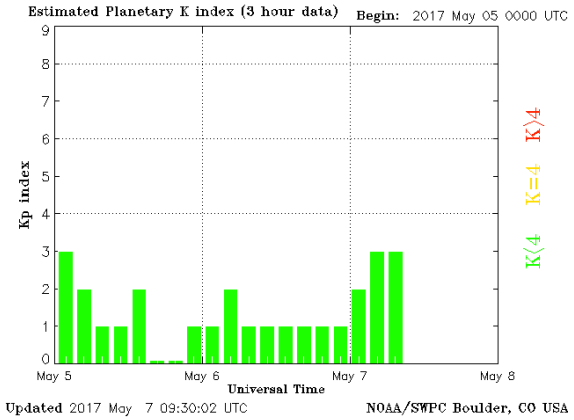
**WEAK IMPACT:** Arriving later than expected, the flank of a CME that left the sun on April 30th grazed Earth's magnetic field during the waning hours of May the 4th. The impact was weak and did not spark a geomagnetic storm. Faint auroras were expected at high latitudes as Earth moved through the CME's magnetized wake on May 5th.

**Week Two**

*May 7th*

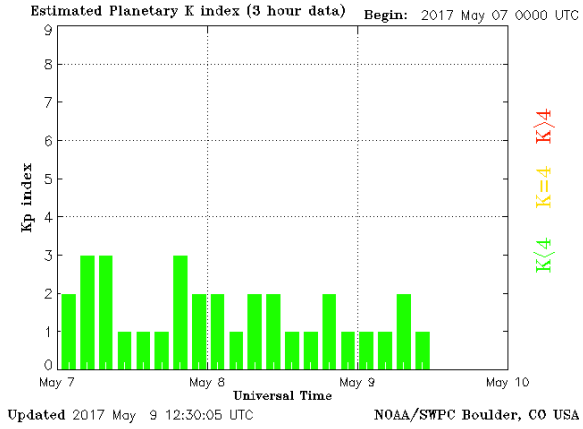
**Quiet Continues:** Solar activity remained at very low levels with no noteworthy solar flares to report. Both regions 2654 and 2655 were expected to remain stable over the following 24 hours.

Geomagnetic activity was also at quiet levels and no major geomagnetic disturbances were currently in the 72 hour forecast window.




*May 9th*

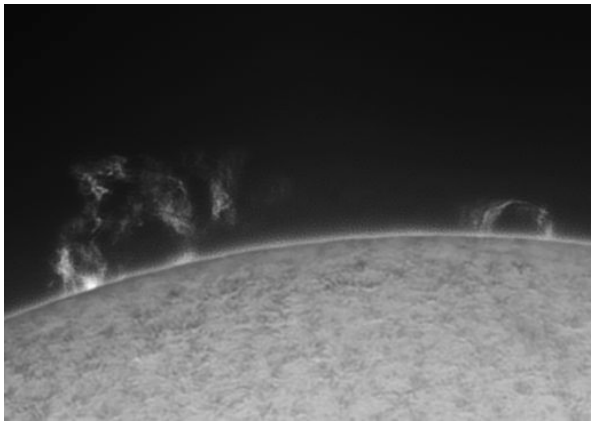
**CME IMPACT POSSIBLE ON MAY 10TH:** On May the 4th, unstable magnetic fields in the sun's atmosphere shifted and hurled a CME into space. The cloud's velocity was relatively low; indeed, it appeared that it would take 6 whole days to cross the sun-Earth divide. NOAA forecasters expect it to arrive on May 10th. Polar geomagnetic activity was therefore possible the following week.

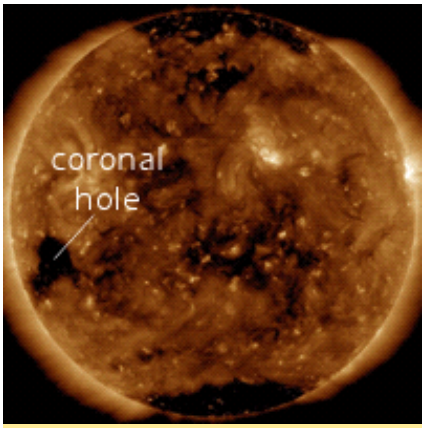


**AN EXPLOSION WAITING TO HAPPEN?** Suddenly, huge filaments of magnetism were rising and falling on the northeastern edge of the Sun.

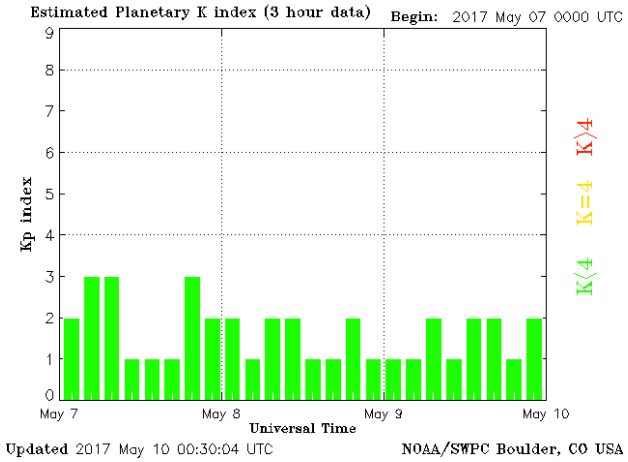
These looping prominences might soon become explosive.

Prominences like these are, essentially, vast tubes of magnetism filled with hot plasma. If any magnetic lines of force cross as the filaments see the --Bang! --the crossing could trigger a ferocious explosion. The process is called "magnetic reconnection."





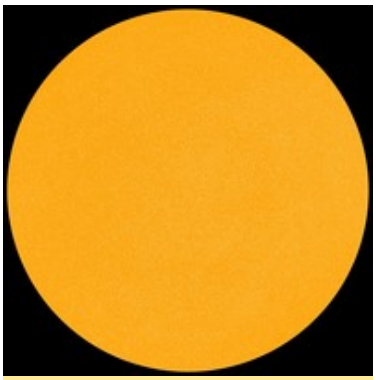

A coronal hole was emerging over the Sun's southeastern limb. Credit: NASA/SDO.




*May 10th*

The disk of our star was completely featureless.

**A 'STEALTH CME' APPROACHES:** When the sun blasts a coronal mass ejection (CME) into space, the event is usually announced by the bright flash of a solar flare or the collapse of a towering magnetic filament. But not always. Sometimes CMEs slowly materialize on their own without an instigating explosion. These are called "Stealth CMEs" and one of them was heading for Earth. A relatively gentle blow from the slow-moving storm cloud could unsettle Earth's polar magnetic field on May 10th.



The sun was blank--no sunspots. Credit: SDO/HMI

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*May 11th*

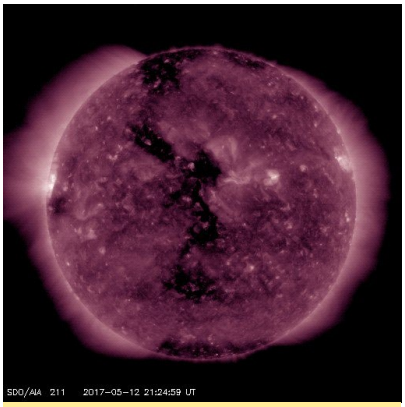
A slow-moving "Stealth CME" swept past Earth on May 10th. The impact was so gentle, it was almost unnoticed. However, there was a periodic disturbance in the solar wind near Earth--waves of south-pointing magnetism that slightly disturbed the geomagnetic field.

This marks the 32nd day in 2017 that the sun has been without spots. Cumulatively, it adds up to more than a month of blank suns--and it's only May. For comparison, it took all 12 months of 2016 for the sun to accumulate 32 spotless days. The accelerating pace of spotlessness is a sign that Solar Minimum is approaching.

Solar Minimum is yin to the yang of Solar Maximum, a natural part of the sun's 11 year sunspot cycle. Contrary to popular belief, Solar Minimum is not boring ...Only different. It brings a time of enhanced cosmic rays, pink auroras, a collapsing ionosphere and accumulating space junk.

There were three consecutive days with zero sunspots this week, May 9-11. Through all of 2016 there were 32 days with no sunspots. Being early May, this indicates an acceleration of the decline of the current solar cycle.

*May 12th*

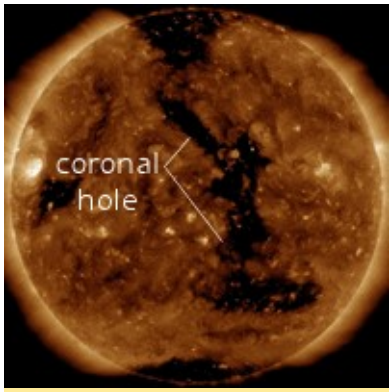



Credit: https://pbs.twimg.com/media/C_qEoz8XsAAOHSX.jpg

A coronal hole was facing Earth. Enhanced solar wind could arrive in ~3 days.

*May 13th*

A middle latitude coronal hole (#88) was expected to become geoeffective after May 15th. Enhanced geomagnetic activity was possible once the high speed solar wind stream arrives past Earth.




Solar wind flowing from this coronal hole was expected to reach Earth on May 15-16. Credit: NASA/SDO.

**Week Three**

*May. 14th*

**A CORONAL HOLE TURNS TOWARD EARTH**
A hole in the Sun's atmosphere has opened, and it is directly facing Earth.

The gaseous stream emerging from this hole was expected to reach Earth during the late hours of May 15th possibly causing mild geomagnetic storms around the poles.

*(Continued on page 11)*

*May. 15th*

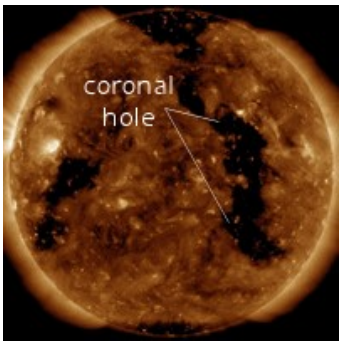
**CHANCE OF STORMS THIS WEEK:** NOAA forecasters say there was a 40% chance of geomagnetic storms this week, beginning with G1-class storms on May 16th , escalating to G2-class on May 17th . The reasons were two-fold. First, Earth would be hit by a stream of solar wind flowing from a hole in the Sun's atmosphere:

Second, a coronal mass ejection (CME) was following on the heels of the solar wind stream. The faint CME left the sun on May 13th , heading slightly south of the Sun-Earth line. NOAA computer models suggest that the cloud would graze Earth's magnetic field on May 17th.

The combined action of the solar wind stream and the CME potentially could boost storm levels from G1 to G2.

*May 16th*

Coronal Hole #88 was now facing Earth and a solar wind stream flowing from this zone was expected to reach Earth within the following 24 hours. Minor (G1) to Moderate (G2) geomagnetic storming was possible at higher latitudes during the following 48 hours.

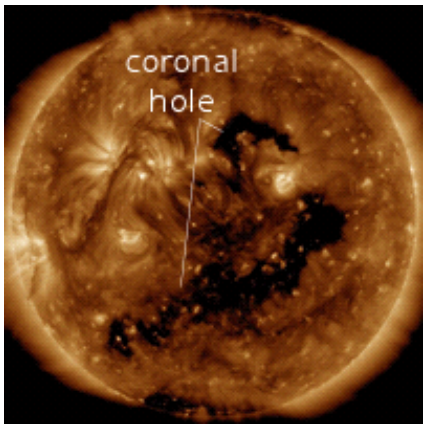


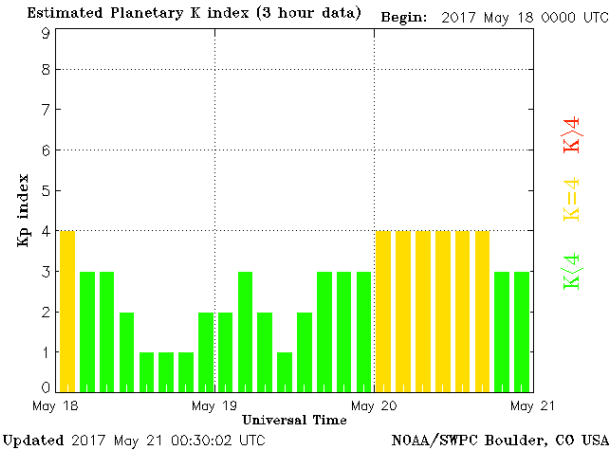

Solar activity remained very low. There were no spot groups present on the visible disk. No new CMEs were observed during the period. (U.S. Dept. of Commerce, NOAA, Space Weather Prediction Center.)

Solar wind flowing from this coronal hole was expected to reach Earth on May 15-16. Credit: NASA/SDO.

*May. 20th*

G1-class geomagnetic storms were underway on May 20th as our planet moved into a fast-moving stream of solar wind.




Earth was entering a stream of solar wind flowing from this large coronal hole. Credit: NASA/SDO.

**Week Four**

*May. 21st*

Earth was moving through a stream of solar wind flowing from a hole in the sun's atmosphere. First contact with the gaseous material on May 20th sparked G1-class geomagnetic storming. More storms were possible on May 21st as solar wind speeds remained at elevated levels above 600 km/s.

*May 25th*: Direct Hit from Solar Eruption: Solar Storm Forecast May 25, 2017: https://youtu.be/mlTZTcplsQU

*May 27th*: Moderate G2 Storm in progress Kp6 threshold reached: 2322 UTC

Forecast: No R1 (minor) or greater radio blackouts are expected. No significant active region flair activity is forecast.

73,
AA0JK
Fred

## Bits Verses Bauds

By Bill Rinker (W6OAV)

The other day several folks on one of our repeaters were trying to determine the difference between bits and bauds in digital communications systems. That conversation resulted in this article which provides a high level overview of the subject.

In early data communications systems the terms bits and bauds were interchangeable. However, in modern systems, due to complex line coding protocols, they are not interchangeable.

Let's start with definitions followed with the explanations with graphics. The dictionary definitions are:
Bit rate is the number of data bits (0's and 1's) transmitted over a medium in one second. 1200 bits per second means 1200 0's or 1's are transmitted in one second (bps).

Baud rate is the number of times a line signal changes state per second. These state changes can be in amplitude, frequency or phase. These state changes are called signal elements or bauds.

Signal elements (bauds) can be looked at as carriers of bits. Let's look at a RTTY signal. Figure 1 shows that a Mark frequency (2125 Hz) is transmitted to represent a 1 bit. A Space frequency (2295 Hz) is transmitted to represent a 0 bit. Each frequency represents a particular bit and each frequency time slot represents a baud. In this example the bit rate and baud rate are the same.

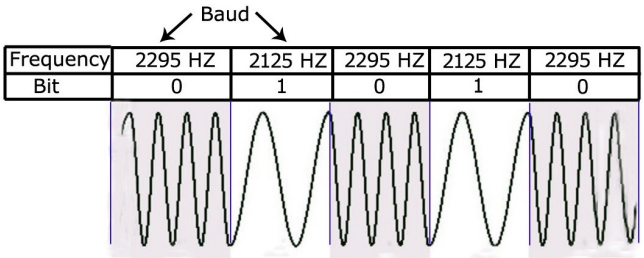


Figure 1 - Bit rate equals baud rate

Channel signal bandwidths determine how fast bits can be transmitted. The faster the bit rate the greater the signal's bandwidth. So, how does one increase the bit rate without exceeding the channel bandwidth? One "stuffs" more bits into each signal element (baud). Let's look at an example. Figure 2 shows an example where each signal element (phase shift) represents a particular pair of bits. A signal phase shift of 0 degrees represents two 0 bits, a signal phase shift of -90 degrees represents a 0 bit and a1 bit, etc. In this example with two bits per baud the bit rate is twice the baud rate.

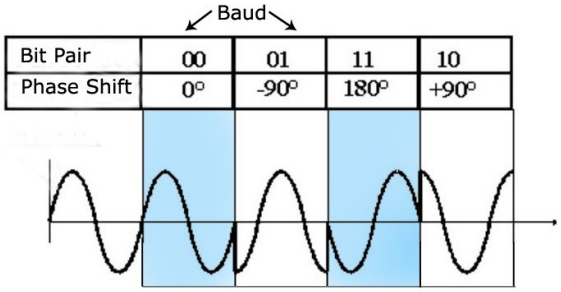


Figure 2 - Bit rate twice baud rate

There are many systems that "stuff" four or more bits into each baud. Most of the present day ham digital modes use some form of "bit stuffing" to increase thru put without producing wide bandwidth signals. A modem operating at 9600 bps is only transmitting 1200 baud per second on the channel. However, it is "stuffing" 8 bits into each baud. Thus,1200 baud * 8 bits per baud = 9600 bps.

Figure 3 is a simple (don't laugh) illustration showing the relationship of bits and bauds. The cars represent the bauds which carry the bits. In this case each baud carries two bits. The bit rate is twice the baud rate.

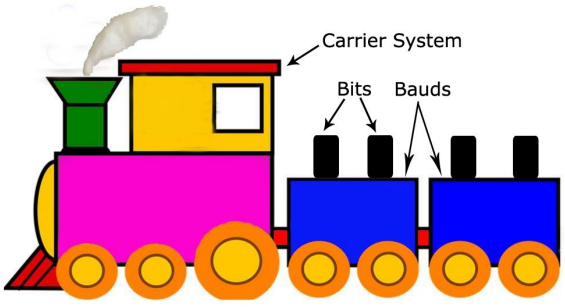


Figure 3 - Illustration of bits and bauds on a carrier

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

**Roundtable August 1960 - DRC Application Form**

# Attention 98-Pound Weaklings!

There's strength in numbers. Join the Denver Radio Club for only a fraction of the cost of a muscle-building course. Just have some muscular friend rip out the coupcn below for you and send it, with $2.50, to Les Richards, WØICR, 140 S. Canosa Ct., Denver 19, Colorado. He'll see to it that you receive ***THE ROUND TABLE*** every month. Besides, you'll enjoy all the benefits of:

- **The TVI Committee**
- **The Technical Instruction Committee**
- **The Club Station, WØOUI**
- **Special Events**
- **Reduced Rates on CQ and QST**
- **The Safe-Cracking Committee**
- **And all sorts of fun**

---

**Okay, here's the $2.50. Don't hit me.**

Name_____ Call_____

Address_____

City_____ Zone_____ State_____

**Send to: LES RICHARDS, WØICR, 140 S. Canosa Ct., Denver 19, Colorado**

Words are from the Technician license manual. The solution for the puzzle is on the next page.

L E N F S R M C I E O T N E

D D O I C A S N R T O E G N

N U I L I C G B O I O X N O

A T T T T E A S T L N A I H

M I A E E S U R A L L M Z P

M L C R N R T R L E I T I O

O P I S O A I R L T M N N R

C M F G H T L C I A I T O C

E A I A P Y I R C S T B I I

L E T I R A T I S X E N N M

E G N N E P Y S O I R T O S

T E E L E B I C E D T E N S

E H D E T C A P A C I T O R

Y T I N A V A I E R K E Y N

**Word List:**

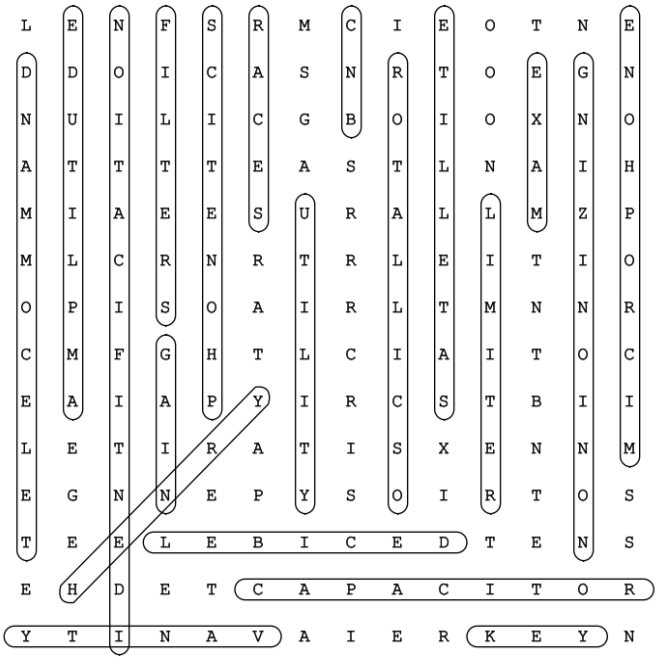
AMPLITUDE
BNC
CAPACITOR
DECIBEL
EXAM
FILTERS
GAIN
HENRY
IDENTIFICATION
KEY
LIMITER
MICROPHONE
NONIONIZING
OSCILLATOR
PHONETICS
RACES
SATELLITE
TELECOMMAND
UTILITY
VANITY

## Fact of the Day

**Guy Insulator Capacitance**

It is well known that antenna tower metallic guy cables should be separated into non-resonant lengths by means of insulators to avoid antenna radiation pattern distortion, frequency detuning, symmetry imbalance, feed impedance change, and other problems that resonant conductors near an antenna can cause. However, the effect of guy insulator capacitance is often overlooked. A long conductor that is separated into sections by insulators is only truly separated at radio frequencies if the insulators have no capacitance. All insulators have capacitance. Therefore, a long metallic guy cable that appears to be broken into sections by insulators is in reality a long conductor with series loading capacitors. Series loading capacitors raise the resonant frequency of a long conductor by an amount that depends on their number, spacing, and individual capacitive reactances. The resultant resonant frequency is not the resonant frequency of the individual sections as is usually assumed.






## Ham Site Of The Month

ARRL Field Day 2017

## The RoundTable Archive

Go to: http://www.wotx.org/roundtables.htm

## The RoundTable Article Index

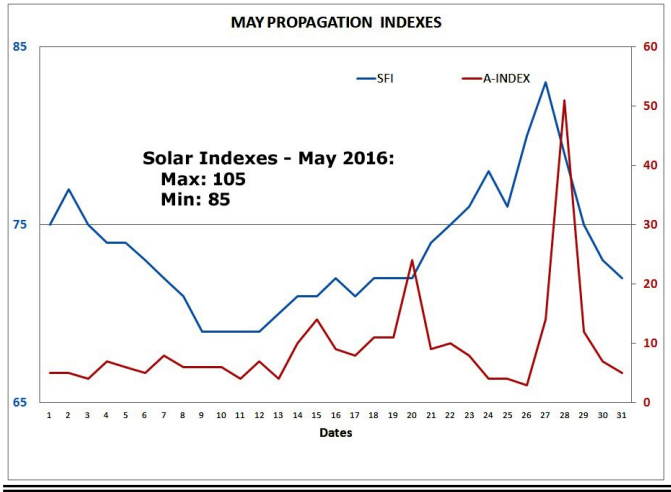
Go to: http://www.w0tx.org/RoundtableArchive/-RoundTables-Index.pdf

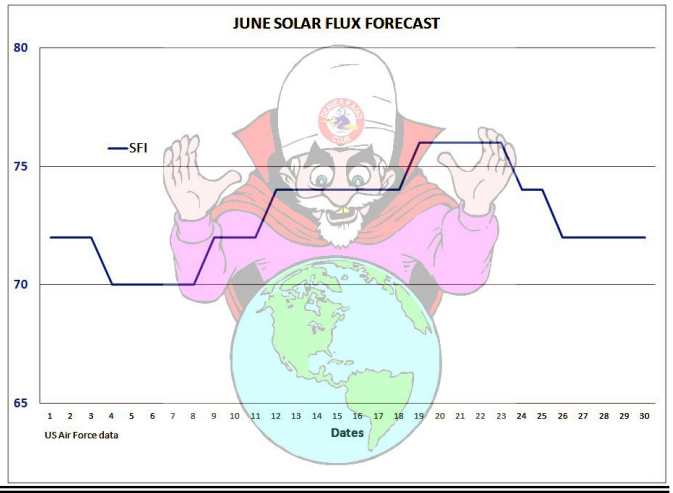
# Past & Future Propagation Conditions

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



## Upcoming Events
### Hamfests & Conventions

| Event | Date | Location | Sponsor Website |
|---|---|---|---|
| Montrose ARC Tailgate Party | 06/03/17 | Lions Club Pavilion | Montrose ARC |

## Upcoming ARRL Contests & Events ARRL Contest Calendar

| Contest | Start Date | Start Time | End Date | Stop Time | Notes |
|---|---|---|---|---|---|
| June VHF | 06/10/17 | 1800 UTC | 06/12/17 | 0259 UTC | |
| Kids Day | 06/18/17 | 1800 UTC | 06/18/17 | 2359 UTC | |
| Field Day | 06/24/17 | 1800 UTC | 06/25/17 | 2059 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 |
|---|---|---|---|---|
| Alabama | 06/03/2017 | 06/04/2017 | Alabama QSO Party | |
| West Virginia | 06/17/2017 | 06/18/2017 | West Virginia State Amateur Radio Council | |
| West Virginia | 06/17/2017 | 06/18/2017 | West Virginia State Amateur Radio Council | |
| Maryland-DC | 08/12/2017 | 08/13/2017 | Anne Arundel Radio Club | |
| Ohio | 08/26/2017 | 08/27/2017 | Ohio QSO Party | |
| Hawaii | 08/26/2017 | 08/28/2017 | Hawaii QSO Party | |
| Kansas | 08/26/2017 | 08/27/2017 | Kansas QSO Party | |

## 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. 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, Members Auto-Patch. 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 |

# JUNE 2017

*DRC Net Sundays at 8:30 p.m. on 145.490 / 448.625 (no PL)*

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | | 1  First Quarter | 2 | 3 |
| 4 | 5 | 6  | 7 **Learning Net** 7:30 p.m. 145.490 / 448.625 (No PL) | 8 | 9  Full Moon | 10 **June VHF Contest -** Begins 1800 UTC |
| 11 **June VHF Contest** | 12 **June VHF Contest -** Ends 0259 UTC | 13 | 14 **Learning Net** 7:30 p.m. 145.490 / 448.625 (No PL)  | 15 | 16 | 17  Last Quarter |
| 18 **Kids Day -** Begins 1800 UTC, ends 2359  | 19 | 20 | 21 **DRC Meeting** Elmer 6 PM General 7 PM | 22 | 23  New Moon | 24 **Field Day -** Begins 1800 UTC |
| 25 **Field Day -** Ends 2059 UTC | 26 | 27 | 28 **Learning Net** 7:30 p.m. 145.490 / 448.625 (No PL) | 29 | 30 | |

## DRC Board of Directors

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| VE Team | KC2CAG | Tom Kocialski | 720-284-1911 | kc2cag@arrl.net |
| Web Master | N0LAJ | Bill Hester | *Check Roster* | *Check Roster* |

**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.

*Subject:* I'm located in…

**Editor's Note**



*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. The submission deadline is the 20th of the Month. ~ Editor*