

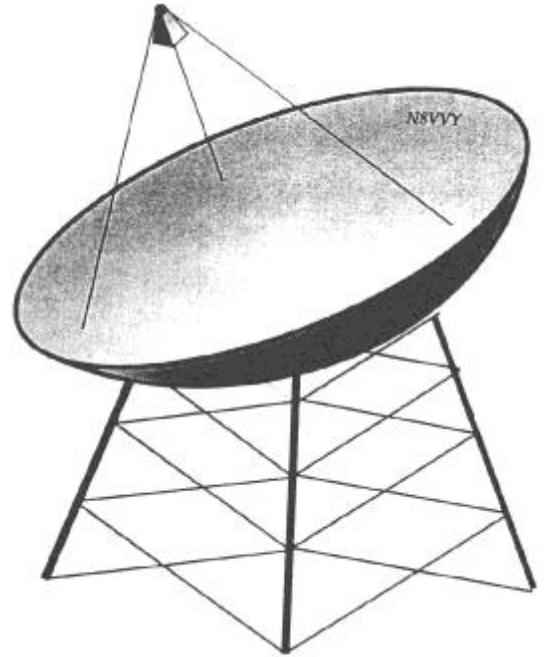
ANOMALOUS PROPAGATION

Newsletter: *The Midwest VHF/UHF Society*

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Annual membership is \$ 12.00. Make checks
payable to Joe Muchnij, N8QOD.



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Beacons: 1296.079 **W8KSE** EM79ur Dayton, OH---- 2W to Big Wheel at 800' AGL.

Listen for the **K9AYA Beacons** at EM79qk, 2W @ 10,368.000 MHz
 both are copied by K4TO daily. 1W @ 5,760.000 MHz

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Gerd's Health Advice

Don't forget to exercise your toes.
 Wiggle them, when you think about them,
 Like before you fall asleep at night.
 They are important for circulation and for balance!

De N8ZM: This column is being written on the day after the January VHF Contest, so if I appear to drift off to sleep in the middle of a thought while still managing to type a complete sentence, don't be too hasty to point it out. Wait until this Friday at the meeting; you'll have an audience and can share the laughter.

I have talked to the Hamvention folks about our MVUS booth and they have told me we should be able to have one, I just need to get the paperwork submitted as soon as they are ready to take orders. No idea where we will be located yet, as the comp'd booths are the last ones they'll worry about putting on the map. It may turn out to be in a tent, so we need to be thinking about that in regards to what we want to have in the booth. Also, Mike Schulsinger, N8QHV, our ever-reliable booth staffer during the show, has told me he is moving to Louisville and will very likely not be available to live in our booth as in past years (Many thanks, Mike!) so we need to have a new plan for staffing this year. We can discuss this on Friday.

Hopefully, by the time Hamvention rolls around, we will have the 2m and 432 beacons installed in Englewood, at a higher location and with new antennas that should let us be heard far-er and wider. As they will be permanently installed (yeah, we thought we'd accomplished that at HARA too) using the W8KSE club call sign, SW Ohio will finally have a signal for checking radios and propagation from this area. Many thanks to W8RKO for his efforts on this.

There are a lot of details still to be determined, like the date, but we are moving forward with the plan to host the Microwave Update (MUD) 2018 conference here in the Dayton area in October of, your guessed it, 2018. I expect that it will require at least 10 of us to tackle all of the various tasks involved so that no one (that means me, mostly) will have to shoulder the whole burden. Inquiries into hotel capabilities, pricing, and schedules have been started on our behalf by Evelyn, XYL of WB8ART. She has a lot of experience in these matters so we are glad to have her working on it. Once we know where that stands we will get serious about putting together the committee to organize the conference. So now is the time to run and hide.

MUD is focused on any and all topics related to ham radio operation in the microwave bands, so the presentation topics range from building microwave devices (up through 76 GHz!) to operating techniques, best practices, station layout, antennas, software...you name it, it has probably been covered. It attracts both the experienced and the newbies, all of them there to share and learn. I don't get to attend every year but I always enjoy learning from the guys who are out there doing it and seeing many friends. I'd say old friends but not all of them are on Medicare yet. These are people I can ask for advice and in turn share what I know with them. A few are good storytellers and always can be counted on for an amusing anecdote. It can't get much better than that!

At the top, I mentioned the January VHF contest conducted over this past weekend. Propagation openings may not have been present (one ham said he was happy about that, we had a level playing field everywhere!), so we had to work a little harder for the contacts we got but the participation appeared to have been pretty good anyway. Of course, the bands were mostly dead while the Panthers beat up on the Packers, but that wasn't a big surprise. For us, the equipment worked pretty well, with only the failure of the 432 mast-mounted preamp as the one frustration. Especially on 6m, there was a lot of digital activity aimed at picking up grid squares while the higher bands (all of them up to 1296) were used to rack up contact points. I think this mode is going to become ever more important for VHF contesting, he said after the fact.

Well, I've used up my allotted space and more for this month, so come see us on Friday the 27th at the MCL. At 6:30 PM. See you there!

de N8ZM.

This and That 2-17

Dream. *The dream begins with a teacher who believes in you, who tugs and pushes and leads you to the next plateau, sometimes poking you with a sharp stick called 'truth'.* [Dan Rather]

US Drivers. *Americans will put up with anything provided it doesn't block traffic.*
[Dan Rather]

Courage. *Courage is being afraid but going on anyhow.* [Dan Rather]

Between a Rock and a Hard Place. *In Italy they would say: Eat your soup or jump out the window.*
[Unknown]

War *does not determine who is right- only who is left.* [Bertrand Russel]

Complicated.. *The most complicated skill is to be simple.* [Dejan Stojanowitch]

And... *everything is complicated if no one explains it to you.* [Frederick Backman]

Overkill. *The "Kerastasa Haircoach" will sell for around \$ 200.- when it launches later this year. But here is the bigger question: Does the world really need a WiFi connected hairbrush?*
[Brett Molina in USA Today]

Chicken and Egg. *The chicken probably came before the egg because it is hard to imagine God wanting to sit on an egg!*
[Unknown]

Stupidity. *The difference between genius and stupidity is that genius has its limits.* [Unknown]

All done. *"My work is done, why wait?"*
[Note left behind by George Eastman, founder of Kodak]

Re Noah's Arc. *The only thing that stops God from sending another flood is that the first one was useless.*
[Nicholas Chamford, 1741-1794]

No Smoking. *I kissed my first girl and smoked my first cigarette on the same day, I haven't had time for tobacco since.*
[Arthuro Toscanini]

The Seasons. *Winter falls short, when you use the astronomical method to count the days: 93 go to spring, 94 to summer; but only 90 to fall and 89 to winter.*
[PBS-Jan. 2017]

Repeaters Galore. *When you travel in Germany you are probably within reach of one or more repeaters. These are mostly on 2m and 70cm, but a few also on 23cm.*
[Gerd]

Newspapers *are unable, seemingly, to distinguish between a bicycle accident and the collapse of civilization.*
[George Bernhard Shaw]

RADIATION CLOUDS AT AVIATION ALTITUDES:

A new study published in the peer-reviewed journal *Space Weather* reports the discovery of radiation "clouds" at aviation altitudes. When airplanes fly through these clouds, dose rates of cosmic radiation normally absorbed by air travelers can double or more.

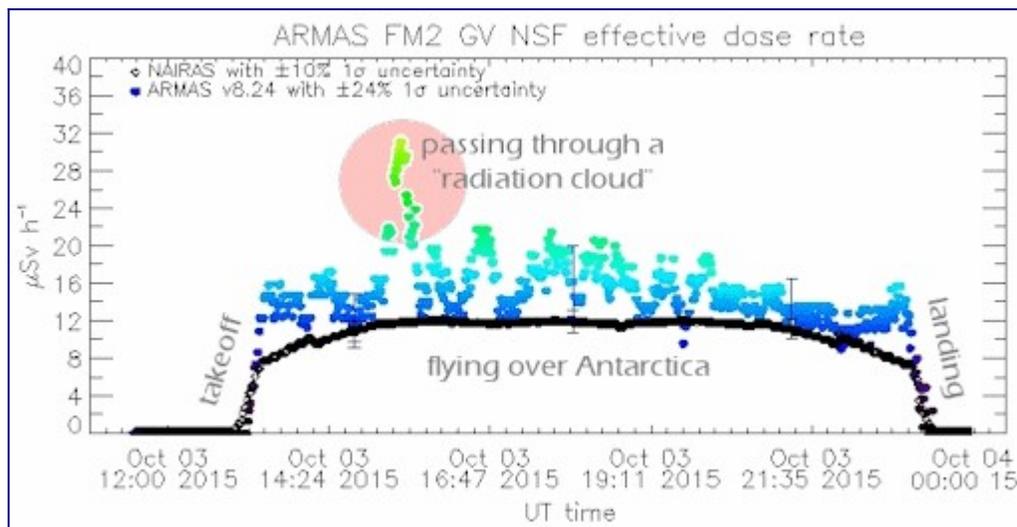
"We have flown radiation sensors onboard 264 research flights at altitudes as high as 17.3 km (56,700 ft) from 2013 to 2017," says Kent Tobiska, lead author of the paper and PI of the NASA-supported program Automated Radiation Measurements for Aerospace Safety (ARMAS). "On at least six occasions, our sensors have recorded surges in ionizing radiation that we interpret as analogous to localized clouds."

The fact that [air travelers absorb radiation](#) is not news. Researchers have long known that cosmic rays crashing into Earth's atmosphere create a spray of secondary particles such as neutrons, protons, electrons, X-rays and gamma-rays that penetrate aircraft. 100,000 mile frequent flyers absorb as much radiation as 20 chest X-rays—and [even a single flight](#) across the USA can expose a traveler to more radiation than a dental X-ray.

Conventional wisdom says that dose rates should vary smoothly with latitude and longitude and the height of the aircraft. Any changes as a plane navigates airspace should be gradual. Tobiska and colleagues have found something quite different, however: Sometimes dose rates skyrocket for no apparent reason.

"We were quite surprised to see this," says Tobiska.

All of the surges they observed occurred at relatively high latitudes, well above 50 degrees in both hemispheres. One example offered in their paper is typical: On Oct 3, 2015, an NSF/NCAR research aircraft took off from southern Chile and flew south to measure the thickness of the Antarctic ice shelf. Onboard, the ARMAS flight module recorded a 2x increase in ionizing radiation for about 30 minutes while the plane flew 11 km (36,000 feet) over the Antarctic Peninsula. No solar storm was in progress. The plane did not abruptly change direction or altitude. Nevertheless, the ambient radiation environment changed sharply. Similar episodes have occurred off the coast of Washington state.



Above: Radiation measurements made by ARMAS while flying over Antarctica. The colored points are from ARMAS. The black points are from a NASA computer model ([NAIRAS](#)) predicting radiation dose rates.

Throughout the flight, ARMAS observed higher dose rates than predicted by the model, including a surge highlighted in pink. What's going on?

"We're not sure," says Tobiska, "but we have an idea."

Earth's magnetic field, he explains, traps many cosmic rays and solar energetic particles in structures called "magnetic bottles." These bottles can be leaky. Even minor gusts of solar wind can cause the trapped particles to squirt out the ends of the bottle, sending beams of particles down toward the Earth below.

"Basically, we think we might be flying through some of these leaky particle beams," says Tobiska.

Tobiska notes that a team of South Korean researchers has observed similar variations in radiation while flying sensors onboard a military aircraft near the border between the two Koreas ([Lee et al 2015](#)). If the phenomena are the same, the Korean measurements would suggest that "radiation clouds" may exist at middle latitudes, too.

The ARMAS program has a busy flight schedule in 2017. "We'll be looking carefully for more 'clouds' as we continue to characterize the radiation environment at aviation altitudes," says Tobiska.

Stay tuned for updates and, meanwhile, read Tobiska et al's original research at this URL:

<http://onlinelibrary.wiley.com/doi/10.1002/2016SW001419/abstract>

Sharable permalink to this article: [Radiation Clouds at Aviation Altitudes](#)

1-20-2017 space news

“Old News”

While cleaning out my basement of some very old magazines I came across an interesting announcement in the **November '48 QST**:
By Joe Muchnij N8QOD

The Transistor - an Amplifying Crystal.

There was a time in the early days of radio when the "oscillating crystal" could be catalogued with sky hooks, left handed monkey wrenches and striped paint, because no one knew how to amplify a signal with galena, silicon or other crystal. All this changed by the recent Bell Telephone Laboratories announcement of the "Transistor," a small germanium-crystal unit that can amplify signals, and hence be made to oscillate.

[portion deleted]

It doesn't appear that there will be much use made of Transistors in amateur work, unless it is in portable and /or compact audio amplifiers. The noise figure is said to be poor, compared with vacuum tubes, and this fact may limit their usefulness in some amateur applications. These clever little devices are well worth keeping an eye on.

*** on the same page: ***

"Many American hams have diminutive XYLs ... microwives."

Story on Solar Eclipses

Total solar eclipses are seen on Earth because of a fortuitous combination of circumstances. Even on Earth, the diversity of eclipses familiar to people today is a temporary (on a geological time scale) phenomenon. Hundreds of millions of years in the past, the Moon was closer to the Earth and therefore apparently larger, so every solar eclipse was total and there were no annular eclipses. Over a billion years in the future, the Moon will be too far away to fully occlude the Sun, and no total eclipses will occur.[\[39\]](#)

Due to [tidal acceleration](#), the orbit of the Moon around the Earth becomes about 2.2 cm (~one inch) more distant each year. It is estimated that, in slightly less than 1.4 billion years, the distance from the Earth to the Moon will have increased by 30,400 km. During that period, the apparent angular diameter of the Moon will decrease in size, meaning that it will no longer be able to completely cover the Sun's disk as seen from the Earth. This will be true even when the Moon is at [perigee](#), and the Earth at [aphelion](#). Moreover, the Sun is increasing in diameter by about 5% per billion years.[\[40\]](#) Therefore, the last total solar eclipse on Earth will occur about six hundred million years from now.[\[39\]](#)_____From Wikipedia

Reverse Engineering Calculator For Parallel Resistors

Suppose that you needed (as I did) an 83 Kiloohm $\pm 2\%$ resistor-- what paralleled resistor combination would provide that value?

Plan A would be to use your calculator to plug resistor values into the formula and iterate the process until you obtain the right values.

Plan B would be to use the handy calculator published here...

<http://www.sengpielaudio.com/calculator-parallel.htm>

...Which in this instance produces 18 resistor pairs that provide the right resistance and tolerance. In about two seconds.

The Electric Car

by Gerd, WB8iFM

The greatest fuss made about the electric car is usually revolves around the battery. All the little ‘portable gadgets’ today's homos walk around with are a never ending cause of battery anxiety. So the range of the electric car, not quite there yet, where a full tank of gas gets you, is for many people a reason not to consider an electric car. However, for cruising around the neighborhood in medium size towns it is the ultimate convenience and extremely practical. And some businesses, even our AF museum provide not only premium parking but also the possibility to charge your battery while you visit!

But back to the battery and the associated range which is presently around 200 miles. This is quite remarkable, and if you add the capability to have charging outlets at your destination at work, in 8 hours the battery should be about full to get you back home!

If you go on a trip, that would not work. So let's think: a little over 100 years ago in the “horse & buggy” age, how did they travel? I figure, these horses would pull you for about 50 miles or so, then you would stop at the next way station, usually a tavern where you could get food and drink and stay overnight, give both humans and horses time to rest. Or if you were in a hurry you could swap horses, well rested, from an earlier coach and keep going. I don't know the details, but that is the concept!

Now I suggest, instead of the horses, you swap batteries. The batteries, standardized and all fitting in similar sized cars or even having different sizes to include like pickups. They should be built to easily be handled with a special cart that moves the battery underneath the car. I can imagine that exchange could be even faster than pumping gas.

I understand such a system is presently in use, not in the US, but in China. Where in the US are the Edisons today, when we need them? Are they looking at their smart phones and give up? Come on: “Let's make America great!”

Television From Antennas to Cable

By Gerd, WB8IFM

First came the radio and the telephone. Most people had the radio, some the telephone and there were public booths with “pay phones” almost everywhere people congregated. Then came “cable”. Hotels/motels at the time already had satellite TV with big (~20ft dishes) too big for the average home owners. Fiberglass was in the works, but too expensive for the homes. Many homes now have a “hybrid connection”, that is fiber goes to a neighborhood box, and from there it is the old twisted pair going to your house. And, as most hams live on tiny lots or on the ground floor of a high rise, they are often (like myself) at the “end” of the line, and a couple of hundred feet will cut the super speed of fiber down quite a bit.

Cable was the great compromise that just about worked for everybody. Plenty of bandwidth, translating into a lot of channels that customers wanted. But when the initial offering was quite so attractive that we were often looking forward to a cross country trip with a couple of stays at motels to watch a history or science related program, or an old movie, the offering nowadays is such that we do not even turn the TV on for the WX. On our last trip to Lake Erie, we actually, on leaving, found a spider web across part of the TV.

All along digital TV was introduced, and with it a multitude of extra channels as well, and since we were more than happy with regular, “over-the-air” TV, we now were looking forward the improved quality and the extra channels. And as the Quality was all that one could hope for, the Quantity did little to attract new viewers. As a matter of fact; most commercial stations used for years practically nothing on these extra channels (they were, of course within the same channel like Ch2-1, 2-2, 2-3, 2-4, 2-5. Some stations had a continuous Weather channel, later they substituted this with reruns from old shows.

When all was new with “digital” I did quite a bit of experimenting with big antennas, but eventually settled on the good old corner reflector with a modified folded dipole for UHF. I think some stations still use VHF but UHF only will do fine for most people. BTW we mostly watch PBS. They are the only ones to use all available 5 channels.

With our fixed (to the south) antenna at ~ 75 ft, we pick up ~ 30 stations, with all available channels counted, these are 150 channels. As I mentioned, many of those are not occupied, however. We receive 3 PBS stations with a total of 11 different programs. A few are duplicates.

What brought about this TV rant? Well I stumbled on an article by Lou Frenzel in Communique, titled: Is it time to bring back the TV antenna? He makes quite a point to “cut the cord”. Antennas will be sprouting again in the neighborhood.

I still remember the guy that walked by the house a long time ago and asked me: Do you really use such a big antenna to watch TV?” He was pointing to my 5 el shortwave beam at 100 feet.

High Gain 3D Corner Reflector

Joe Burke,



This 3-sided corner reflector provides about 18 dBi gain!!! The driven element is a simple $\frac{1}{4}$ vertical, and requires one additional grounded director element for a good match. The three sides are about 2.8 square. The ground-plane side can be reduced to a triangle, but that lowers the gain to about 16.5 dBi. Mounting requires a special bracket, as the main lobe extends at a 45° angle from all three surfaces. For 1296 MHz the sides are about 26" long.

Source: <https://blog.freifunk-mainz.de/wp-content/uploads/2013/08/Shortened-3D-Corner-Reflector-Antenna.pdf>

Discone Antenna explained

Dave Sublette, K4TO had some questions about a discone antenna he built. We all know what a discone looks like and that it covers a wide range of frequencies. But here is a very good answer and brief explanation about some fine points by a true antenna guru!

Hi Dave

The size of the cone determines the lowest frequency the antenna will work at. How fine you can make the gap between the cone and the disk determines the highest frequency.

One trick used on many of the commercial discones that say 27-15000 MHz is to mount a CB loaded whip in the middle of the disk. So it's really a 27 MHz 100-1500 MHz antenna with a big gap between 28 and 100 MHz.

So if you want to use it on 29 MHz and 2 Meters +, consider taking a few turns off, or shortening the whip on an old CB antenna and mount it in the middle of a more manageable sized discone.

73 Kent WA5VJB

For Sale: HP 436A Power Meter with cable and 8484A sensor with 20 dB pad. Sensor max power is -20 dBm so pad brings it up to 0 dBm. Set is functional and has been checked against known good references and reads close enough for

the stuff we do; it just ain't NIST traceable. \$350. Contact n8zm@mvus.org.