Ridgeway Repeater Group. Newsletter for Third Quarter 2018

Messages/Notices

AGM: It was good to see the members of the repeater group attending with some new faces seen which is encouraging.

GDPR: I thank all of our members that have given us permission to use their emails but there are still one or two that have not.

GB3TD: The PSU developed a fault and a temporary replacement is in use to keep it running. A site visit has been performed and the original PSU has been repaired and it is now back in service and doing a sterling job.

This fault did not affect GB7TC as that is running on a different PSU.

GB3WH: Is running on the updated equipment and working normally.

The antenna change for GB3TD is still planned but we have not had confirmation of availability for the engineer whom will be needed to climb the tower to install this.

The consolidation of the equipment into one rack is being planned and waiting availability of people to go to site to perform the work.

I say big thank you to everyone who have contributed articles as this helps me provide a varied and interesting newsletter.

Articles

First Article composed by Richard G4MUF

My main reason for writing on this topic is the interest I have had in monitoring the French military radar transmitter on frequency 143.050 MHz. It is located at Graves, central France, and continuously radiates a radio carrier at high power. It is beamed in a broad south-facing arc, with the object of detecting satellites or ballistic missiles. So, one can listen for meteors as well! Later I mention another radio way to listen to meteors, using just an ordinary FM broadcast receiver.

I tuned a radio scanner (an AOR 3000A) connected to a rooftop antenna, onto the frequency, choosing USB as the mode. The first thing to do is to tune to a frequency slightly below the 143.050 Mhz. That is because, obviously, nothing would be heard tuning bang-on the radar's signal because it would be zero-beat. So I tuned to 143.0495 Mhz, i.e. 500 Hz lower. This means an audio tone of 500 Hz (143.0500 minus 143.0495) would be heard from a transmitted 143.0500. I avoided selecting Lower Side Band (LSB) because the radio naturally filters out the unwanted sideband. The radar transmitter is well out of line-of-sight range from UK, making it ideal for our purpose.

Two distinct sounds are heard each time a meteor streaks through the ionosphere: A short rapidly descending squawk or chirp, and/or a longer steady ringing note. The squawk indicates radio waves reflecting off the fast moving meteor itself, while the steady note means reflections off the trail of vapour left hanging in the sky for a short while.

Consider a graph of distance, s, being the sum of the Graves-meteor and meteor-radio receiver distances, plotted against time, t (in milliseconds for this purpose). s is annotated up the left side and t along the bottom of the graph. The s/t line could be (a) horizontal straight line, or (b) a sloping straight line, or (c) a curve. In case (a) the path is constant in length, as with the reflection off the stationary vapour trail. Case (b) would mean the distance is shortening or lengthening at a constant rate with time, i.e. constant velocity. Case (c) means it is changing at a variable rate.

The radio frequency received in case (a) is constant and equal to Graves's rf. In case (b) the rf would be constant but lower (path lengthening) or higher (path shortening) than Graves's rf. If the pitch is sliding with time, the rate of change of distance is itself changing, case (c). case (c) means acceleration or more likely deceleration (of path length, not necessarily actual speed of the meteor). Since the meteor is always getting nearer to the surface as it burns up, the path length, s, is usually shortening regardless of where it is in the sky. The audio frequency received, if tuned as above, during a meteor 'ping' rapidly descends from say 1000 Hz to the 500Hz. The meteor is obviously decelerating due to friction, but it can't be much of a speed reduction in only a second of time even if it is pulling 10g. A much larger deceleration is just due to the path-length deceleration. One could of course set up the radio on LSB, but tune 500 Hz HF of the nominal 143.050 instead of our USB+LF setting. Doing that makes for an ascending audio squawk. The bottom line is there is a "blue shift" (raised frequency) so a higher pitch, but the pitch

I was surprised that quite often I heard the squawk but not the ringing tone, or vice-versa. The word "Pings" is often used to describe the sounds, and I would guess the word refers to the steady-pitched note off the trail, not the squawk off the meteor.

Sometimes the steady note jumped in loudness which might be due to what the radar is putting out, not the trail's behaviour.

After several days a lot could be gleaned. The meteors reached a rate of one every 5 seconds for short periods on the mornings of the peak (11-13 August, nominal peak 0800Z 12th). Over the 3 or 4 days the rate averaged about 90 per hour in the mornings. I noticed the time-of-day variation explained below. Two or more meteors 2-3 seconds apart came on several occasions. Were they in micro-gravity association, or one had broken into several? Logs suggest that the Zenith Hourly Rate is 150, i.e. 150 meteors seen by one observer corrected to assume they are coming down vertically. An observer would only see a small fraction of the meteors entering the atmosphere globally. The one-half of the Earth, facing the incoming shower, has an area of 205 million KM2, and a given observer can only see about 3 million Km2 of that , i.e. 1/70th of the area above the horizon at the approx height of meteors.

A bright idea I tried was to have two radios and antennae with the second one tuned slightly different. I put the second one on 143.0492 Mhz, to produce an 800-Hz note for the ping so I would hear a harmony of the ping from the 2 radios (500 and 800). I was also hoping to find the squawk would be heard hopping from one radio to the other! My reasoning was that the meteor reflection might have begun, and/or ended, outside the USB audio passband of the radio tuning, so the second radio might pick up a different part of the note. In actual fact both radios played the squawk together, just at offset pitch, like 2 trombones. This proved I was in fact hearing each squawk's real start and finish, just at different pitches. It seems that no reflections are heard from the cold meteor before it is heated up to incandescence and burn-up.

The Perseid meteor-shower peaks at August 12-13 each year, but is a very broad trial of debris so lasts from early-August till month's end. The comet which sprinkled the solar system with the Perseid dust is Swift-Tuttle. These meteors travel at 60 Km per second !! Therefore they shine, (and reflect radio waves) for less than one second of time if coming down steeply through the 40-km of their incandescent life-span. It is named, like all the showers, after the constellation from which the meteors appear to radiate, Perseus in this case. Its an apparent rather than real direction, being the vector-difference between the Earth's velocity (30 Km/sec) in its orbit and the meteors' velocity relative to the overall Solar System. Compare with driving at night with snow falling. The flakes in your headlights appear to radiate from a point roughly in front of the car, but maybe slightly to one side, or from a direction which swings around slightly. The flakes' real motion is downwards of course, plus an angle caused by the wind.

"Meteor Scatter" is one of several radio propagation modes which an ordinary radio-listening member of the public may occasionally happen upon by chance . Others modes of course are F2, Sporadic-E, and Tropospheric. However us radio amateurs make deliberate efforts to contact distant radio hams by these modes.

Meteors, or “Shooting Stars”, zip into the ionosphere at great speed, and are heated to white-hot temperature as they pass through a height range of 120 down to 80 Km, and in fact they are vaporised and burn up to nothing towards the lower height. They leave a trail of highly ionised gas which persists for a few seconds, sometimes longer. The meteor itself reflects radio waves during its brief death throe of white heat, but the trail reflects for much longer, sometimes 20 seconds. This is long enough for completing a QSO with the distant radio station, provided both stations are ready and equipped.

Meteor showers occur at several set times in a year as per the calendar below. Each shower means the Earth is then passing through the trail of dust left by a comet. The meteors are merely specks of sand or dust that were ejected from the comet’s icy surface, by spurts of gas boiled or sublimed out of vents on the comet’s surface, by solar heat.

Perseus fortunately lies near enough to the Pole Star to be above UK horizon 24 hours per day. Therefore radio reflections occur all the time during the shower. But, they peak when Perseus is at its highest in the sky (07:00 BST). Then, they are coming down almost vertically. Conversely, Perseus is low to the North at 19:00 and the meteors streak in at a low angle. This affects the duration of each burn-up: high angle makes for short glows; low angle lasts longer, obviously. However, meteor numbers detected at a given place are fewer with low-angle entry into the atmosphere.

The next big shower is the Geminids around Dec 13-14.

The ‘ordinary FM radio’ method I mentioned at the beginning is merely to find as many vacant frequencies on the 88-108 FM Band-2 (or CCIR) and put them into a scanner. During a meteor shower, set the rig scanning just those frequencies. You should hear burst of broadcast from somewhere with some of the meteor descents.

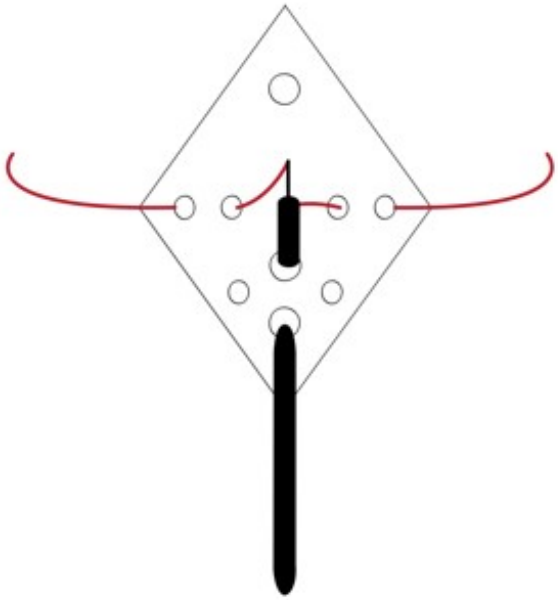
		Rates, meteors per hour			
Date	Shower	1	2	3	4
Jan 3-4	Quadrantids	5	10	25	120
Apr 21-22	April Lyrids	3	5	10	18
May 4-5	Eta Aquarids	3	5	10	60
Jul 28-29	Delta Aquarids	3	5	10	20
Aug 12-13	Perseids	10	20	50	100
					Oct 7-8
					Draconids

		Rates, meteors per hour			
Date	**Shower**	**1**	**2**	**3**	**4**
Oct 21-22	**Orionids**	**5**	**10**	**15**	**23**
Nov 3-13	**Taurids**	**1**	**2**	**3**	**5**
Nov 16-17	**Leonids**	**3**	**5**	**10**	**20**
Dec 13-14	**Geminids**	**20**	**50**	**75**	**120**
Dec 21-22	**Ursids**	**1**	**2**	**5**	**10**

Second article composed by David M0TFY

Portable HF Antenna – Linked Dipole – David Butler M0TFY

A quick and lightweight antenna which I use when I travel. I get good results with even modest (8m) heights on 80m.
I start off with a bit of plastic cut from an old plastic bottle and drill/punch some holes in it.



Three larger ones – two for the coax (I use RG58) and one to pop over the top of the fishing pole – or to tie to a line thrown over a tree.

I use six smaller holes for cable ties and/or for the antenna elements themselves. The elements are covered stranded hookup wire – I like lightweight. [See the photos]

I solder the elements directly to the coax and wrap it all in self amalgamating tape, more to protect the coax from water flowing down inside it than anything else.

I personally don't use insulators as I just tie off with a little nylon string. Sometimes I need to let ends droop down or go around a corner etc. depending on space available.

Dipole can be flat or inverted-V configuration – your choice depending on your conditions, trim as appropriate

To make the linked dipole I cut my shortest elements first (highest band) a couple of inches longer than indicated in the table below, check SWR, adjust as required. Rather than cutting if too long, I fold and twist it back on itself. SWR changes between flat topped dipoles and 'V' configurations, so I can untwist if resonance is too high if I change location. Once I am happy with the first band, I add wire using a simple knot and just twist band one and band two elements together. Check the SWR on new band and adjust as required. (Check the original band again in case you have added some capacitance.) get the idea.

It is hard to see the elements on such a lovely day, but hopefully you
The image to the right is my May 2018 home configuration. This is resonant on 40m, 60m and 80m. The apex is 7.2m above ground and the pole is just bungy cord tied to a fence post. With my tuner I can use it from 80m-10m comfortably, but if I am trying to be serious on 40, 60 or 80, then I drop the pole, untwist the joins and hoist it up again so I get the best bang for the buck, and I can take the tuner out of the RF path. This runs above and parallel to an electric fence and unless I collapse the pole I do not hear the fence "ticks".

[standard disclaimer – don't put antennas, poles etc. up near power lines. The ones shown in background are 50+ metres away.]

Do I use a BALUN? Not usually. With an inverted "V" you can bring the legs closer or further apart which changes the impedance if needed. It is normally close enough to 50□ that I don't bother.

The length of coax I use is around 12m. I haven't experimented with other lengths but I try to keep it away from any resonant lengths for the bands I tend to use.

Delta Loop

Another configuration I have tried is using it as a full wave [delta-ish] loop on 20m. Take only the 40m elements, join them together and "guy" off the two new corners to form a triangle. I use a tuner and let that handle the [negligible] impedance mismatch.

Have a go at your local park or green. I live in an AONB so permanent antennas are problematic – all my operation is essentially "portable" -- even down to running on batteries most of the time.

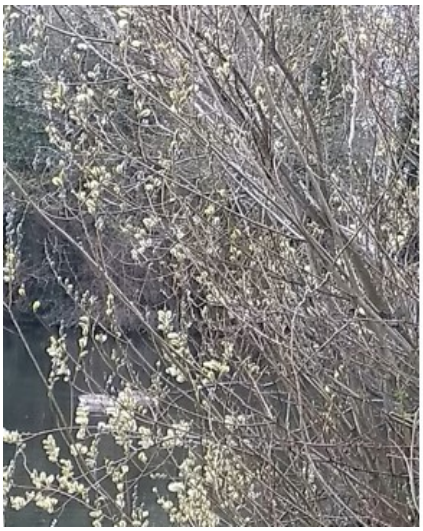
Dipole Lengths

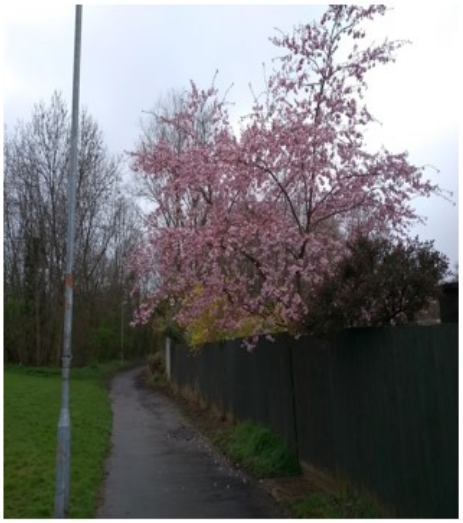
Band	Freq MHz (QRP CoA)	1/4 wave (m)
6m	50.2	1.525
10m	28.36	2.7
12m	24.95	3.075
15m	21.285	3.6
17m	18.13	4.225

Band	Freq MHz (QRP CoA)	1/4 wave (m)
20m	14.285	5.35
30m	10.116	7.575
40m	7.09	10.8
60m	5.333	14.35
80m	3.69	20.75
160m	1.836	41.7

Ramblings from your scribe.

As I sit here on a rather damp day and not much chance of getting out on my daily stroll to join 'The Breathless Walkers Radio Club Net'. I can reflect on some of my walks that had better weather, first some flora: This was taken around my favourite lake and shows some early blooming trees/shrubs before most of the leaves show their faces.





Catkins showing before the leaves, Pink blossom showing before the green of leaves.

Forsythia showing over the fence before it turns green.

Now to show you what the local waterfowl population has been up-to over the last couple of months.

Swan with Signets, there is a pair of swans but the male was a small distance from them on guard as you might say.

This is my first sight of the canada geese with their goslings.

The thing I didn't realise was they are very sociable birds because my next picture on another day I came across this creche of goslings being looked after by one pair while their parent were feeding.

Canada feeding with their goslings on another part of the lake side.