THE NEWSLETTER OF
THE KINGS COUNTY RADIO CLUB

KCRC

September 2022 "NULLUM BENEFICIUM IMPUNITUM" Volume 9, Issue 9

Minutes of the September 7th 2022 KCRC Meeting

Our September "Pre-Meeting Question and Answer Session" ran without any problems.

The monthly meeting was called to order at 8:01PM, by our President Mitch N2RGA. Also present at tonight's meeting were Vice President Berlotte KD2MYF, Secretary Roy AC2GS, Treasurer Frank KD2QPU, Executive-At-Large Jay KD2LRX, Chris KD2WOT, Bob KD2NVB, Ralph KD4RN, Andrew AK4GU and David KD2ZDZ. We had three visitors, Jacque KD2NQF, Lucas KD2ZDK, and Micah KD2ZYH..

The vote to accept the minutes of the July, and August meetings were tabled for this month, due to a lack of a quorum, until later into the meeting.

Treasurer Report—Frank KD2QPU reported that our Treasury currently has $1,759.68 in our bank account as well as $353.45 in our PayPal account for a total of $2,113.13 in assets.

Repeater status was discussed by Mitch N2RGA - There has been no further work on the Repeater, in the past month. Mitch plans to arrange a meeting with those interested in making up a new Repeater Committee. Mitch hopes to arrange this after the 15th of this month.

2 Meter Net Report—None of the rotating NCO's were available at this time in the Meeting, and so the subject was tabled..

10 Meter Report—Roy AC2GS reported that the 10 Meter Net continues to be poorly attended by Club members, and could use more Club member's participation.

KCRC TechNet—Roy AC2GS reported that the TechNet is alive and well, but suffers , as well, from a dearth of Club member participation, so please try to join us on the second and fourth Wednesdays of every month!

Fusion Net Report—Jay KD2LRX reported that the Fusion Net is going very well., and encouraged those attending this meeting to join in on the fun on the FusionNet.

ARES Report—Was tabled due to William AC2ZV's absence.

Old Business: There has been no change, regarding the status of our bi-monthly VE Sessions.

We have 72 members on our Roster. We have no new members this past month. We are still selling Club patches at $5 a piece and $1 shipping and handling. You can save the shipping and handling fee by buying them at our monthly in-person meetings (when they are re-established).

The search for a viable location for our Club's functions (General Meeting and VE Sessions) was discussed. Roy AC2GS submitted a cover letter to ask established organizations if they were interested in donating some space for our meetings.

New Business: Members were reminded that next month's General meeting has been moved to Monday, October 10th, 2022, due to the Jewish Holidays coming up in late September and October.

The meeting was closed 8:25 PM.

Stay Safe Everyone!

These minutes were respectfully recorded and submitted by Roy AC2GS on this day, September 7th, in the two thousandth and twenty-second year of our Lord of Propagation.

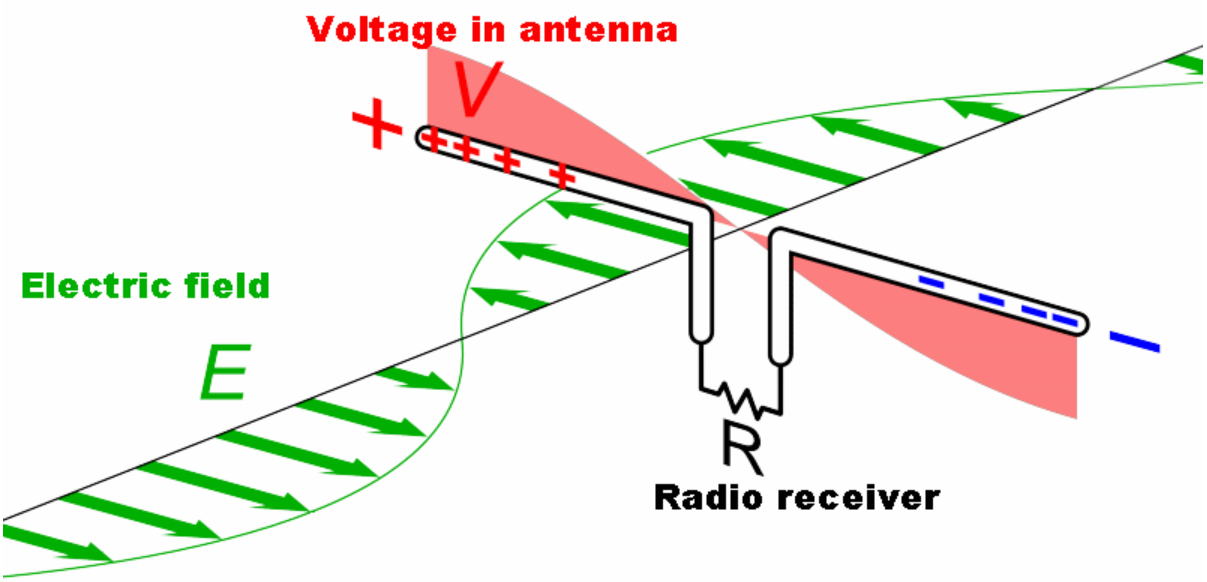
How Do Simple Center-Fed Dipoles Radiate Their Radio Waves?

Well, It's Complicated

(Part of the "Fun with Antenna Simulator Series)

I am trying out something a little different in this series, light on technical concepts and heavy on antenna simulations. Keep in mind that all these illustrations are computer generated and based upon, albeit very accurate, approximations. Nevertheless, as the saying goes, just keep in mind, "garbage in, garbage out!

I thought that we would take up the case of one of the simplest antenna varieties out there – the center-fed, resonant dipole.



Most Hams are aware of the simple, 'back of the envelope calculation for the approximate length of a resonant center fed dipole:

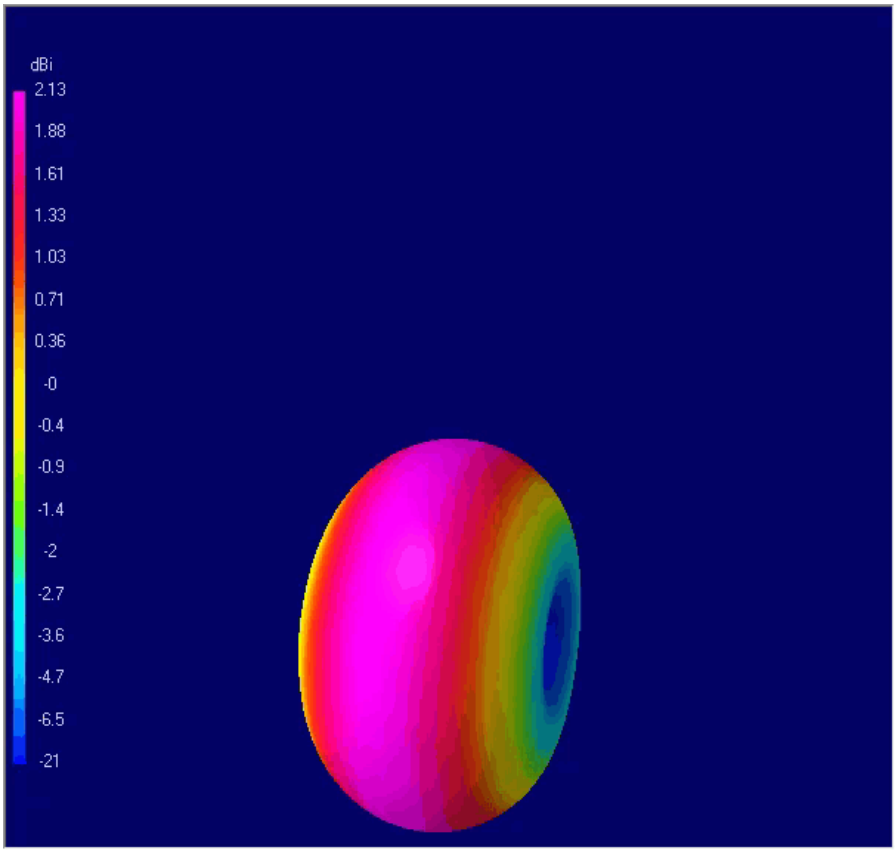
Length (ft) = 468/frequency (MHz)

It's a little shorter than using one-half wave's length by the velocity of the speed of light in a vacuum and was derived by experimentation in the 1930s and published in one of the ARRL's earliest books. The reason that a center-fed dipole is resonant at a length that is just a bit shorter than a half wavelength of a given frequency in free space is due to the capacitive nature of a dipole's ends – they effectively electrically lengthen the dipoles - that is why it is called the End Effect.

But we shall leave that 'rabbit hole' for some future article. Right now, we're going to do some interesting antenna simulations.

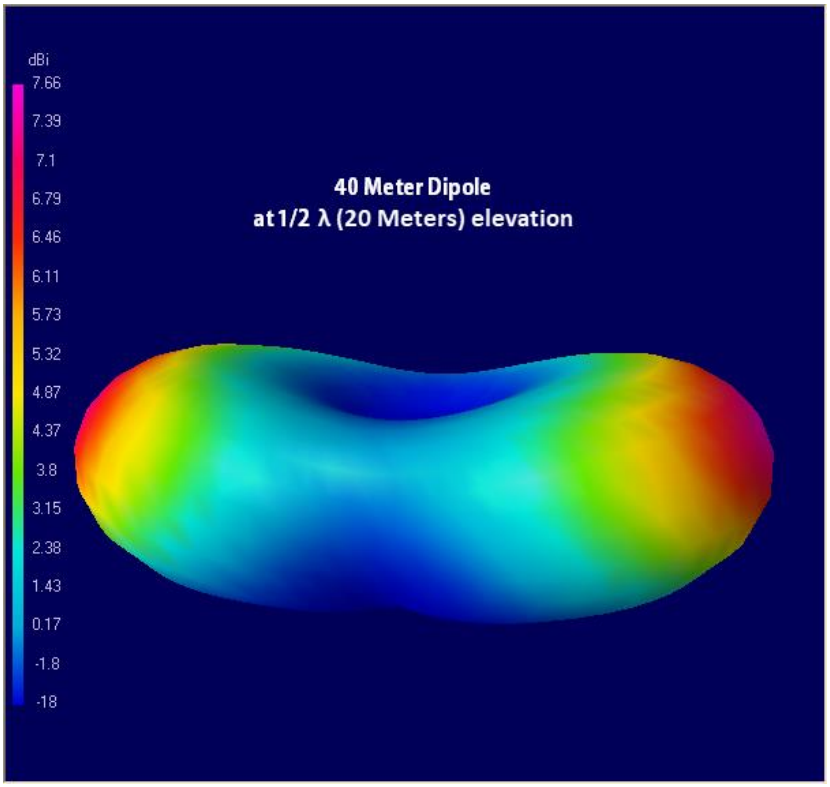
If you look up resonant center-fed dipoles, you will read that they have a gain of 2.15 dB (that is at its maximum signal on its broadsides) when compared to a uniformly radiating antenna, much like an incandescent light bulb,

and has a radiation pattern that looks a lot like this:



But that is only the case in ‘free Space’. If you are working with NASA and plan to use that dipole out in the vacuum of space, you have the exact correct model in mind. If you intend to use your dipole a bit closer to the good old terra firma, your dipole won’t radiate at all like that!

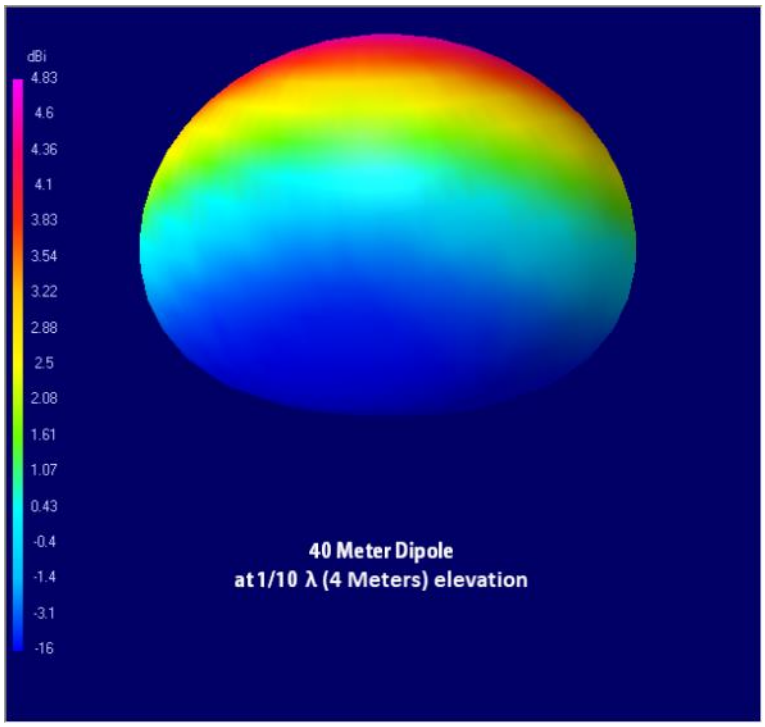
Most Hams that have had experience with center-fed dipoles will caution newer Hams not to hang their dipoles too low to the Earth. The illustration for a resonant center fed dipole at ½ a wavelength above ground, the often cautioned minimum height looks like this:



Notice how the high-energy lobes are pointed just a little bit up (keep in mind that the red-colored part has a lot more RF energy than the blue-colored portions)? Right at that lovely horizon so that the iono-sphere can let your signal reflect and refract that signal all over the world!

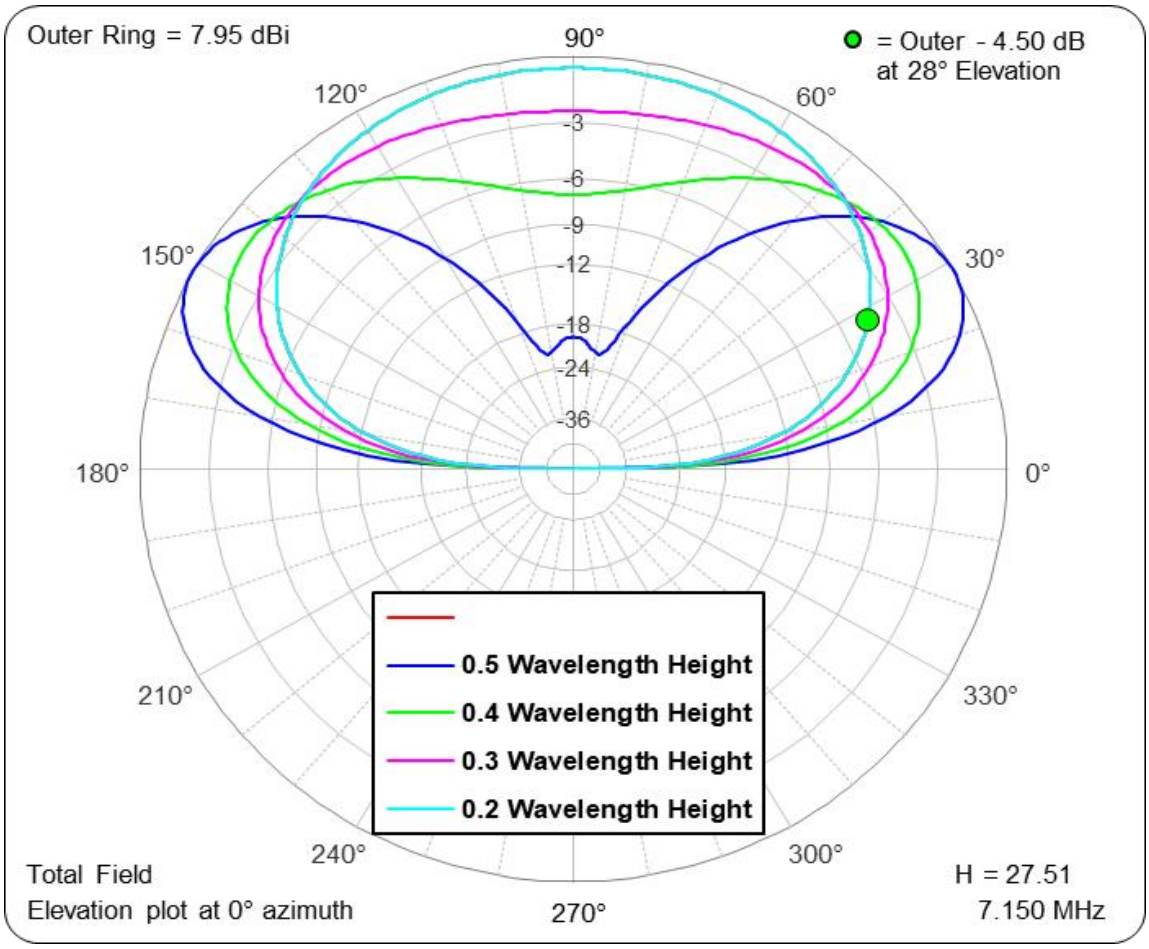
But what happens if you don't listen to those other Ham's advice and just make sure that your dipole just doesn't drag across the ground? After all, what is the difference between a dipole elevated ½ a wavelength and one elevated 1/10th a wavelength off the ground?

Well, this is what you'll get:



Oops! Almost all that RF is pointed straight up above you! This is known as a Near Vertical Incident Sky Wave (NVIS) or a 'Cloud Burner". If you want to warm up those clouds above you or talk to your next-door neighbors, this antenna will do a fine job. If you want to talk to someone outside of your zip code, lotsa luck. That radiation pattern isn't going to help you much for DX operations.

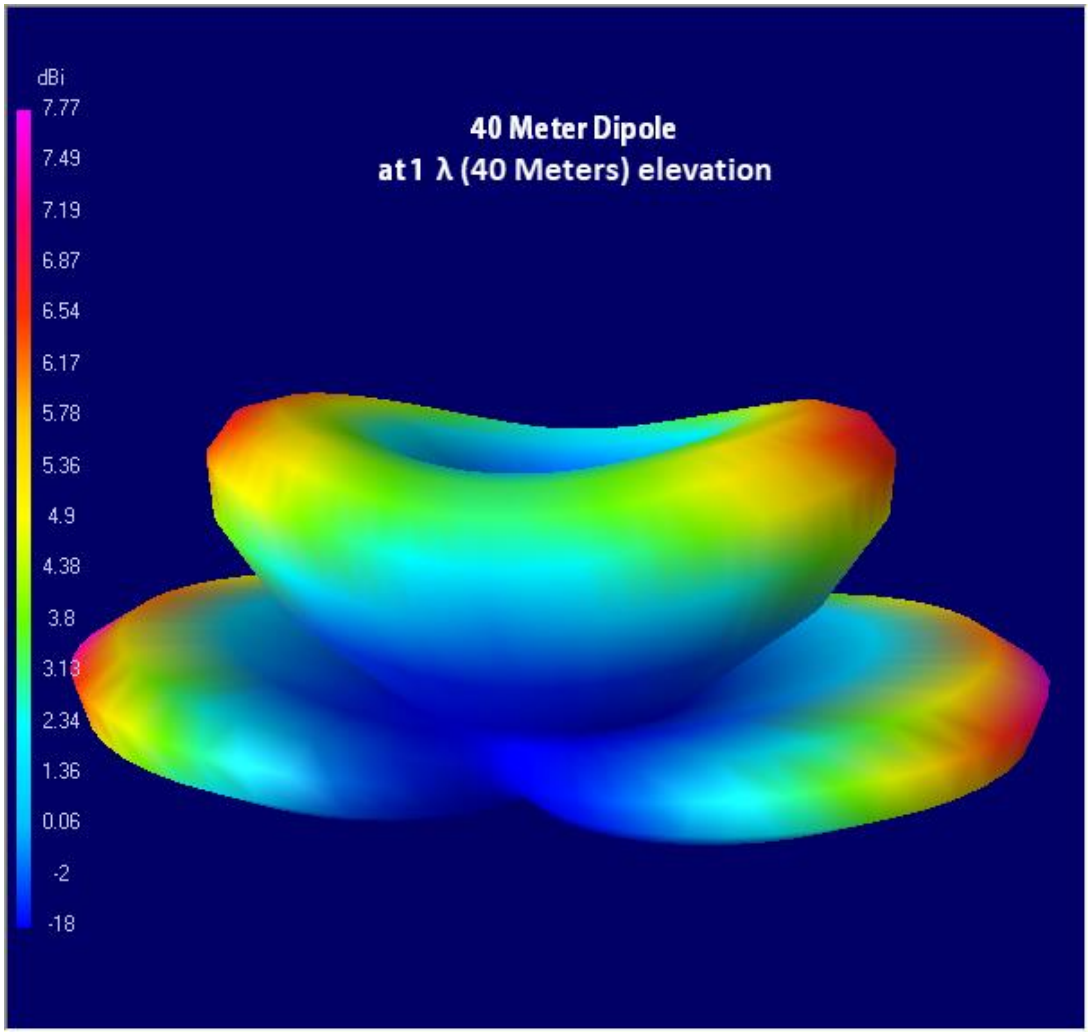
Here's another illustration to compare the differing elevations as your dipole elevation gets closer and closer to the ground:



Now, I have covered this much before in other articles, but let's go a bit further down this particular 'rabbit hole'…

If a resonant center-fed halfwave dipole works well at an elevation of ½ a wavelength, how much better would it work if you could raise it even higher? After all, if something is good for you, taking ten times more should be ten times better. Right? No?

Let's try raising this simulated antenna up to a height of 1 wavelength in height above ground.



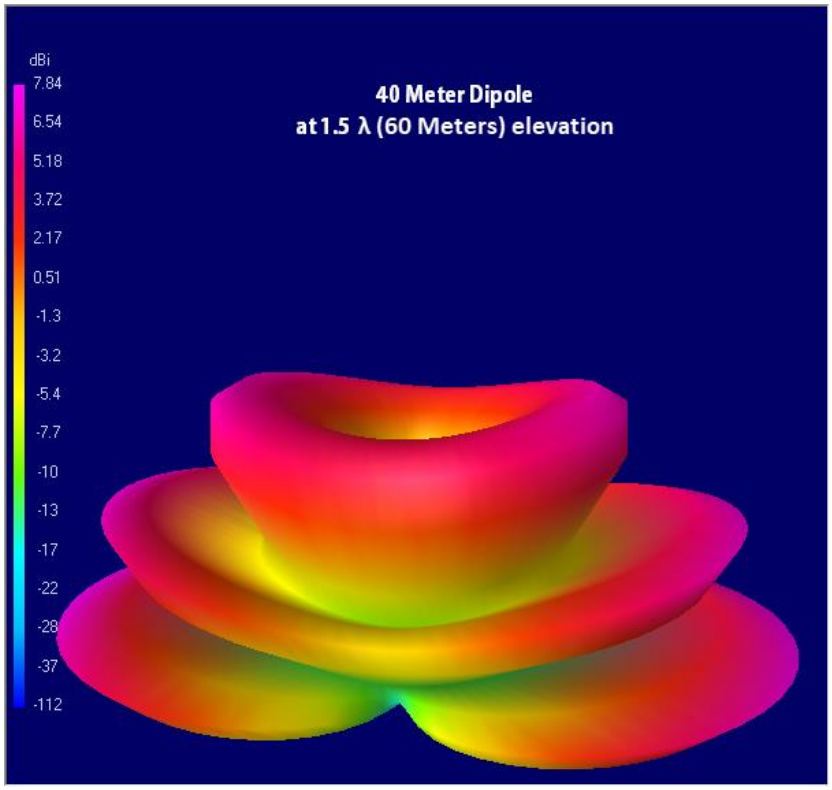
Well, that's 'different'… It seems to have developed another lobe, flatter than the first one.

This bring us to the question, often heard on 75 Meters: is there a "sweet spot," an optimal height for all dipoles?

Well, is their 'an optimal' hair color? Of course not! And it's the same way with any "sweet spot" for a dipole's height. If you are most interested in nearby contacts, those dipoles which are real low to the ground might suit you. Interested in very long-distance DX? Well, as long as you don't live in some valley or surrounded by large building, a very low take-off angle, as seen in our last example, might suit you better, but your signal might skip over large areas on the Earth. Interested in intermediate DXing – then maybe the 0.5 wavelength height with its higher take-off angle might suit you.

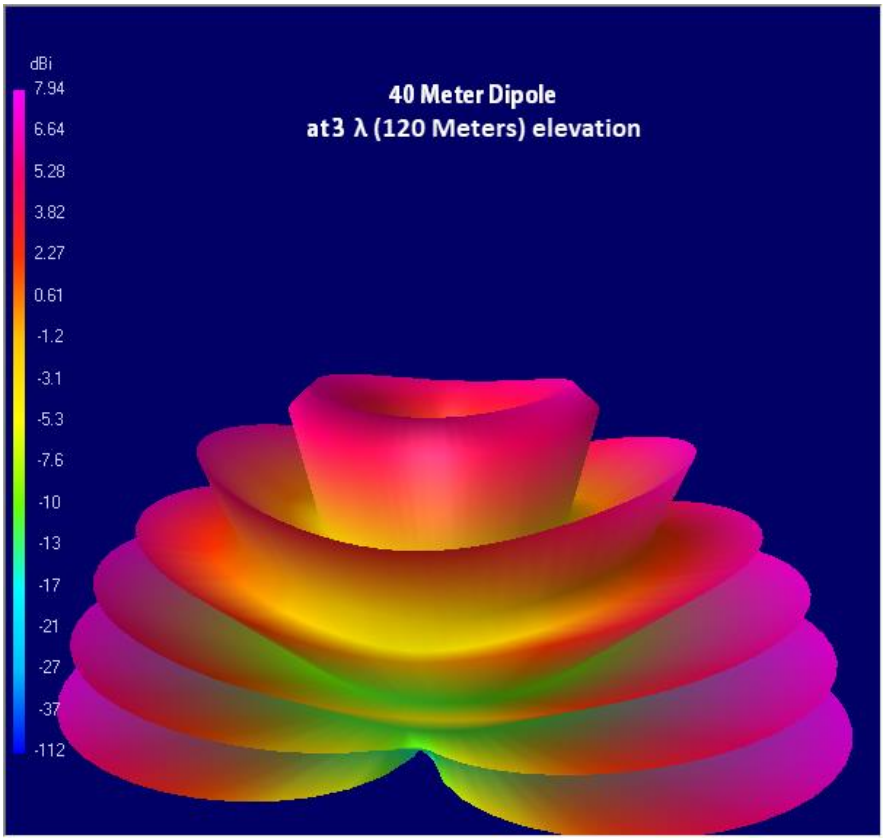
A compromise with the height set at 0.6 wavelengths seems to be very popular, but there is no "one size fits all" in Ham radio. The height you decide upon should be based on your surroundings and where you would like your signal to go…

Let's see what raising it even more to 1.5 wavelengths in height will accomplish:



Gee… now we have three lobes – we still have the almost horizontal one that wrote about earlier, but now also have a new lobe that is seems to be pointed higher up – a very high 'take-off angle.' That might be a problem…

Let's just go crazy and hoist our simulated antenna up to 3 wavelengths above the Earth:

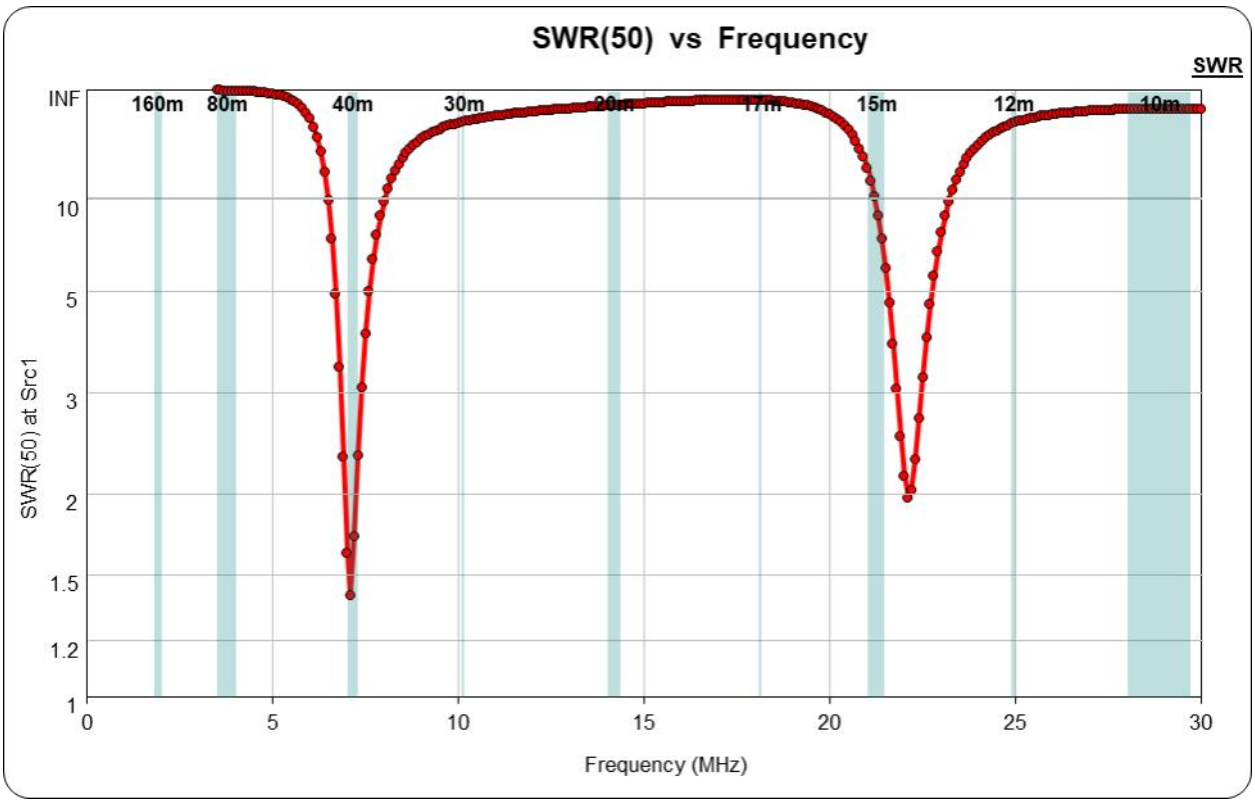


Gee… it just looks like a lot more of the same. A bunch of more lobes that are pointing more and more towards that vertical angle…

So, as most people have no doubt told you: don't' hang your dipole too low off the ground. But now you know that a lot of extra height leads to a severe case of 'diminishing returns. Try your best to get it at least a half wave off the ground, but too much of a good thing, as usual, ain't any better and can make it worse.

And before we call it an end for this particular article, have you ever wondered if you could get away with using that dipole on the rest of the Ham bands?

Well, here is a simulation of the SWR for a simple 20 M center-fed dipole:



Center-fed halfwave dipoles are resonant at odd harmonics, so a 40 M dipole can sorta be used around the 15 M band, BUT you really need to use a very good antenna tuner to get there!

Well, that's it for this time. If these kinds of articles spark your interest, let me know, and if there are any kinds of antennas that you would like to see simulated, let me know.

73,

Roy AC2GS