# *V2000 modification – replacing the 0m50 with 1m50 radials*

*Foreword:*
My V2000 has served for over 20 years as the base antenna for 6m, 2m and 70cm. It has seen many storms and rain, as well as enough sunshine. When we acquired our home on the Nassau Avenue in Haarlem, the V2000 was first placed on the roof if the annexe at the rear of our house, until it was placed on a mast on a tile base on the roof.
In October 2020, the NanoVNA V2 was introduced to my shack. The V2000 had a disappointing SWR on especially 6m (> 1:2). ***)**
Discussions with fellow HAMs revealed that some had replaced all 3 radials with longer (1m45) radials. From PE1OUD, I received a document about his modification. He mentioned 5mm CRES rods, and tapping M5 thread on it.
Radio friend Steven tapped the M5 threads on my three CRES rods.

Modifying with 5mm rods..... did not work! After removal of the existing radials, it appeared that I had M6 thread in the housing for the radials.
Then I found out (with 8mm aluminium tubing for the Gamma Match of my 4m dipole), that an M6 bolt fitted perfectly inside this 8mm tube. So I opted for M6 threaded ends, that fit into aluminium tubes with 8mm OD (and 6mm ID). This is what I will describe in my story.

*More publications*:
On the web I then found a publication in the Hunsotron, a magazine of the Hunsingo division of the VERON. In the 4th edition (2012), there is a description of the original mod by EA4EOZ *If only I had read this earlier....* They talk about M6. threaded ends and aluminium tube of 8mm.....

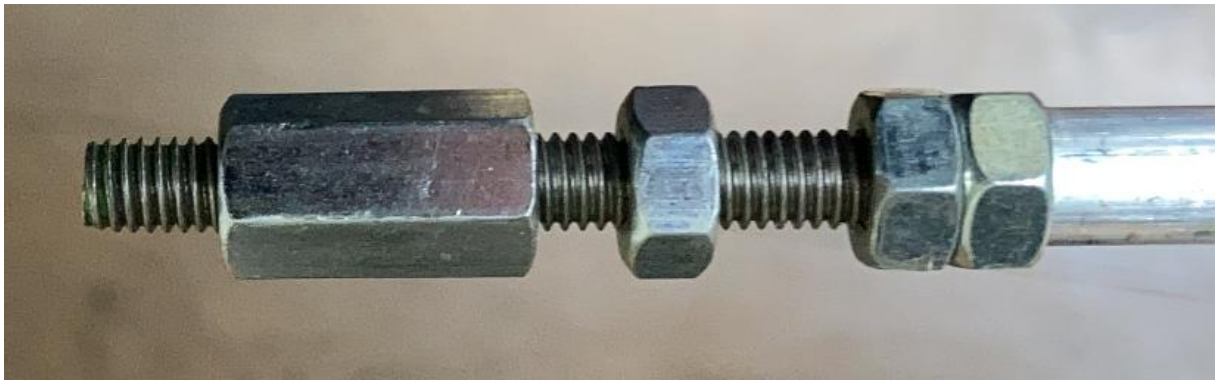
*First thoughts:*
Use a longer (than 1m45) radial and check the effects.

***)** After removing the three radials (during the M5 trial) and putting them back on, suddenly the SWR was OK again…I guess the counterpoise (with little pigtail), had not contacted the housing…..

## *The modification:*

The three aluminium tubes and the CRES threaded end. Plus the three M6 nuts with the larger body.

Fixing the threaded end into the aluminium tube went too easily. For that reason I squeezed the tube slightly in the vice. I did it carefully, until I had to force the threaded end inside.
I used enough length to screw in. Finally I fixed it with 2 M5 nuts, for securing on the 8mm tube. Then the large body M6 nut, together with an extra nut (securing!) was fitted:



This is the idea. We completed three radials (although the intention is to use two).

Final modification? No. The face of the M6 nuts appears to be too large to fit inside the recessed area on the housing for the radials. So Steven machined some material off to 9mm, the useable recessed space diameter.

By tinning he added corrosion protection.

The two 0m50 radials have been replaced with two 1m55 radials, following measurements and comparing the results. I left the original counterpoise in position. I used self vulcanizing tape for extra protection and securing. On the next page you will find results of the measurements as well as several photos of the antenna installation on my roof.

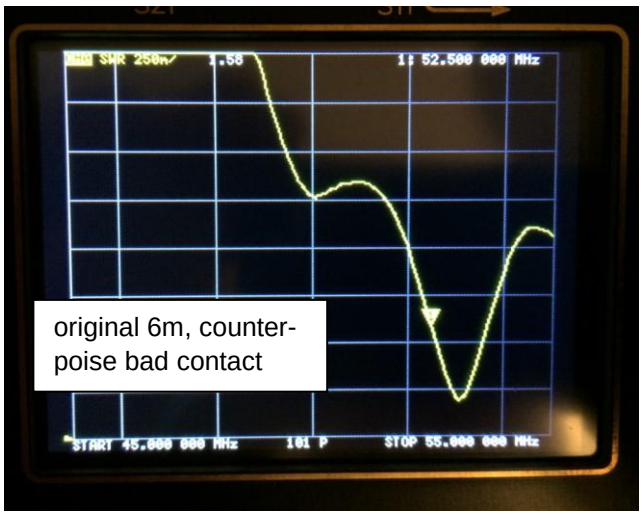
In October 2018 the V2000 had been on the roof terrace for over three years. Then we fitted it on the roof, on an industrial type tile base, galvanized for life (thanks to Cor PA2MCE). On the right photo, Steven is guiding the coax cable down the facade of the house.

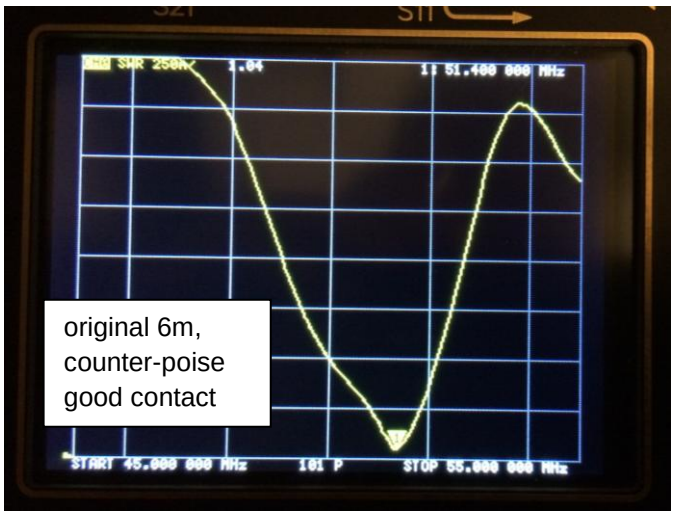
With the old radials.....

...and with two new ones.

*Measurements:*

First the V2000 in October 2020 (see the ***)** story) and in May 2021, after reinstalling the radials again (viewing area is 45 MHz to 55 MHz, 0.25 SWR/div)



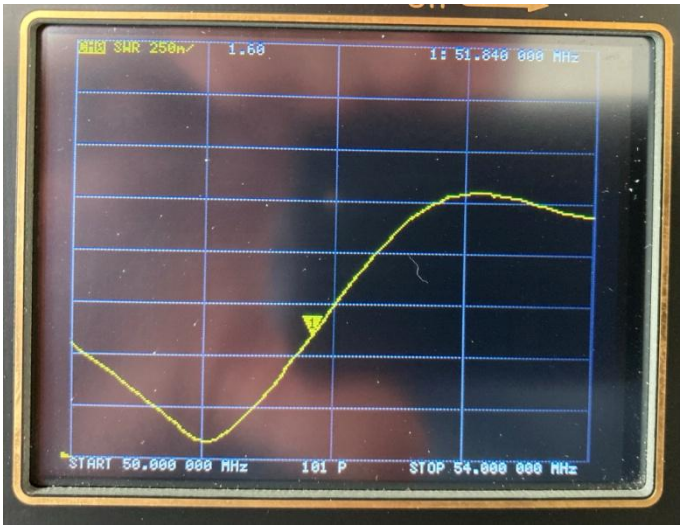




Note the repair! The counterpoise coil mid pigtail had not made contact. Optimum SWR on 51.5 MHz. What a relief!

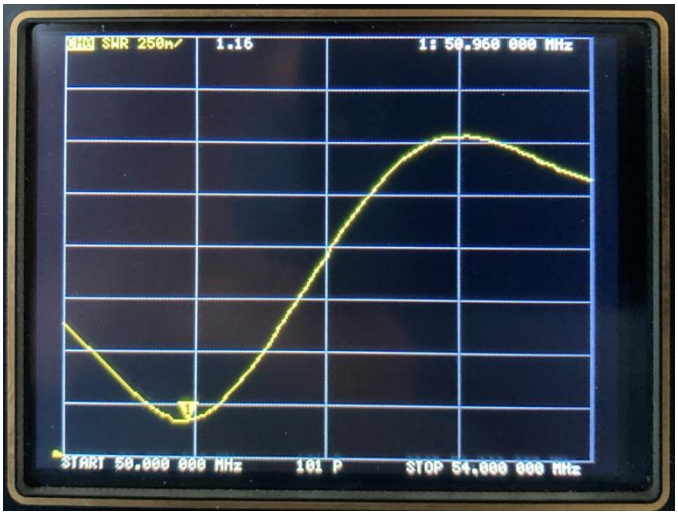
But now the situation before, during, and after the *radials* modification:

While Steven replaced the elements on the roof, one by one, I could follow this perfectly on the NanoVNA in the shack at the end of the coax! What struck the most: SWR does change, but not to such a large extend!

For 2m and 70cm a similar situation came to light. See the next page for that.




Situation 1:
before (2 radials 0m50 and the original counterpoise)



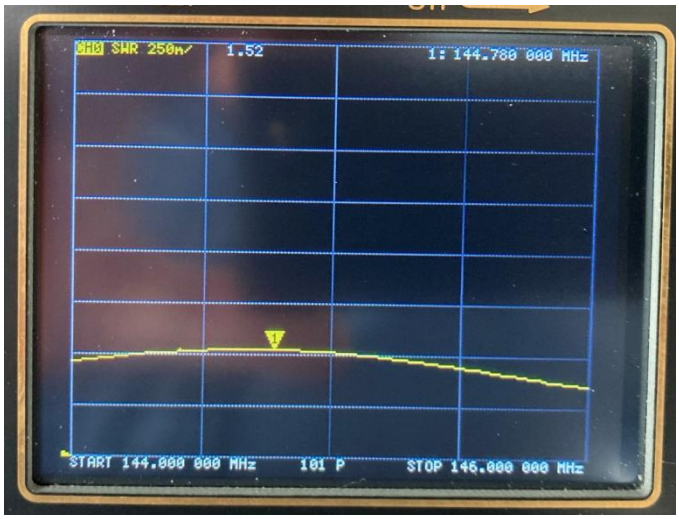

Situation 2:
with three new radials of 1m55


Situation 3:
with one new radial removed and the original counterpoise reinstalled

I chose to keep this configuration. So I have one spare radial of 1m55..... and three CRES rods with M5 thread. You can pick them up!

The effects of the modification on 2 meters. Other than for 6m (where I show the band up to 54 MHz), this is just the European range only.

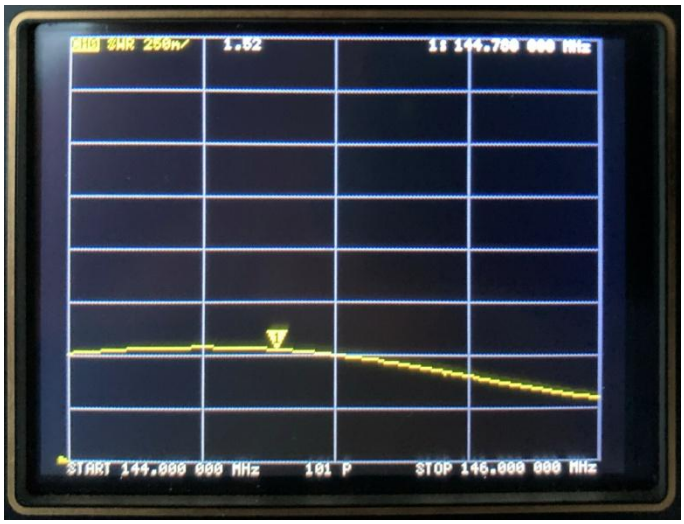
Situation 1:




Situation 2:

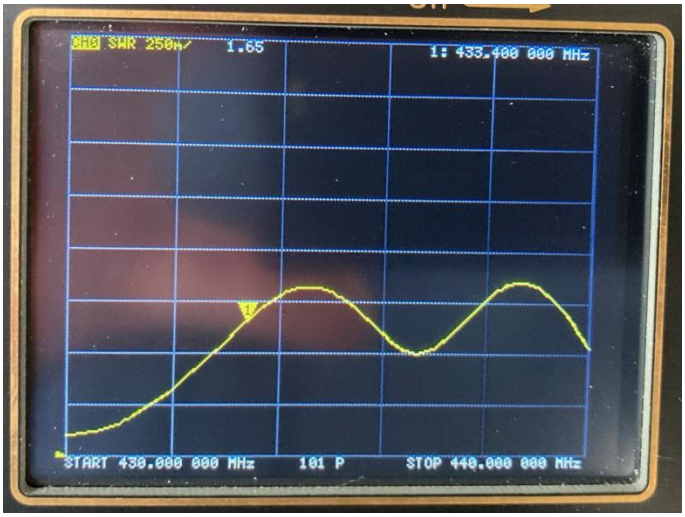

For 2 meters:
No large differences. Each configuration is a bit different, but no adverse effects are visible

Situation 3:

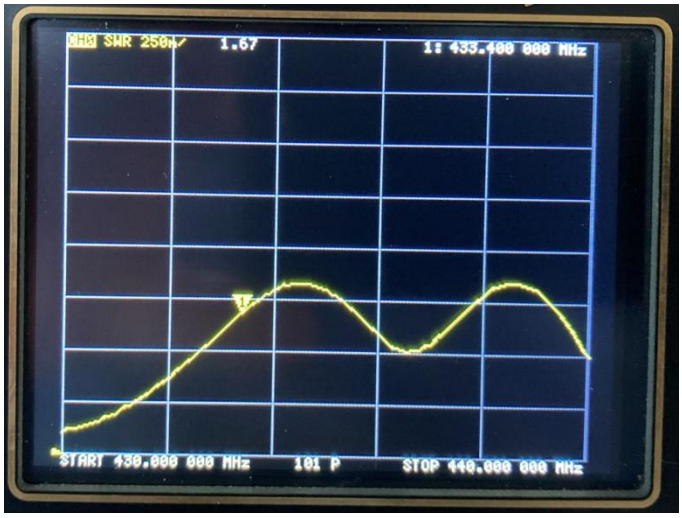


The effects of the modification on 70 cm.

Situation 1:

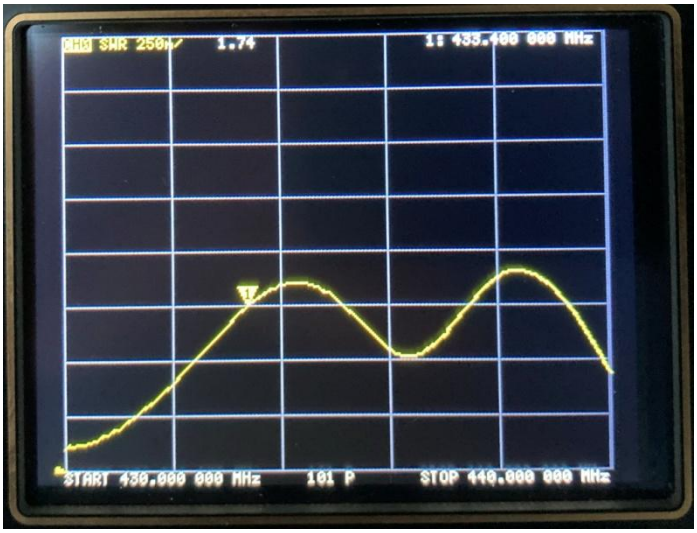



Situation 2:




For 70 cm:
No large differences. Each configuration is a bit different, but no adverse effects are visible

Situation 3:




Although it looks slightly worse for 70cm, the swr in the first 2 MHz is such that I will leave it as is:
2x1m55 radials
1x original counterpoise.

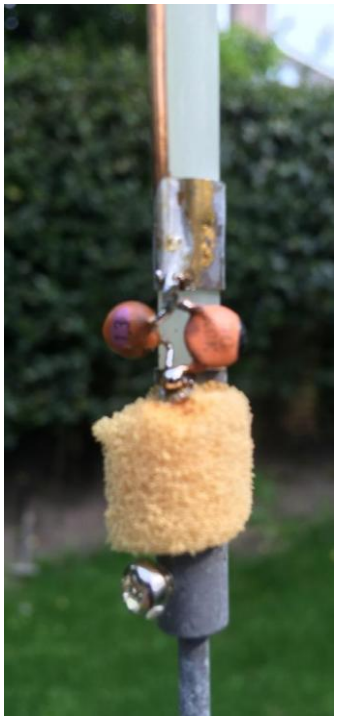
*<u>Epilogue</u>:*

Replacing the two 0m50 radials with 1m55 radials, does not have negative effects on the SWR.

When I started the modification preparations in May 2021, my initiative was followed by fellow HAMs from our Project Group PG.540.

There were a couple of reactions, that the SWR with the new radials did not improve, but degraded. Experimenting with longer radial did not change that. Better results were obtained by adding a capacitor inside the antenna. It is unclear why I never experienced that.
But then there are various versions of the V2000: with one full fiberglass housing, or dividable in two.

Peter, PA0CDY and Robert F4VSG solved their problem by adding capacity to the existing 40 pF capacitor.



Left: PA0CDY, 1,3 pF parallel to the 40 pF capacitor.

Right: F4VSG, 2x 2,2 pF in series, parallel to the 40 pF capacitor

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