DL2GMS Moxon project

20, 15, 10m band
single feed line

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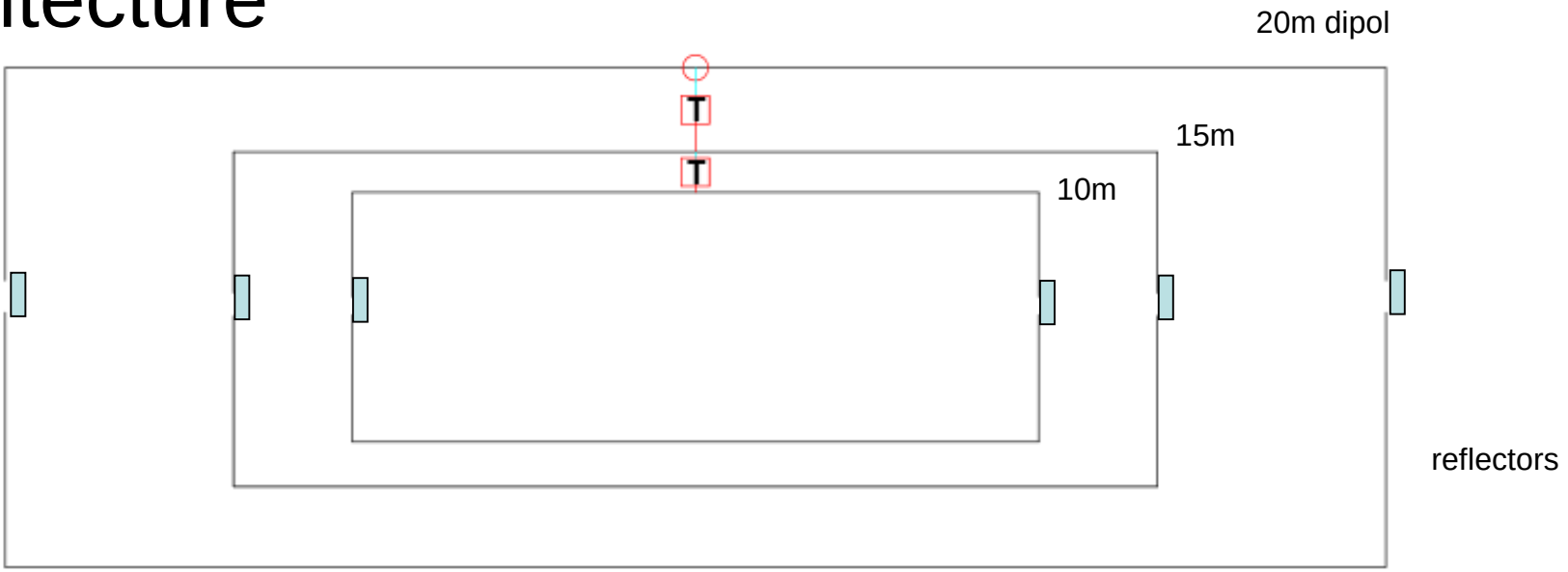
Architecture



Moxon Rectangle

▯ insulator made out of teflon

— bronze wire without insulation 1,5 mm²

T Transmission Line, 50 Ω symmetrical

O 1:1 balun homemade current and voltage balun in series

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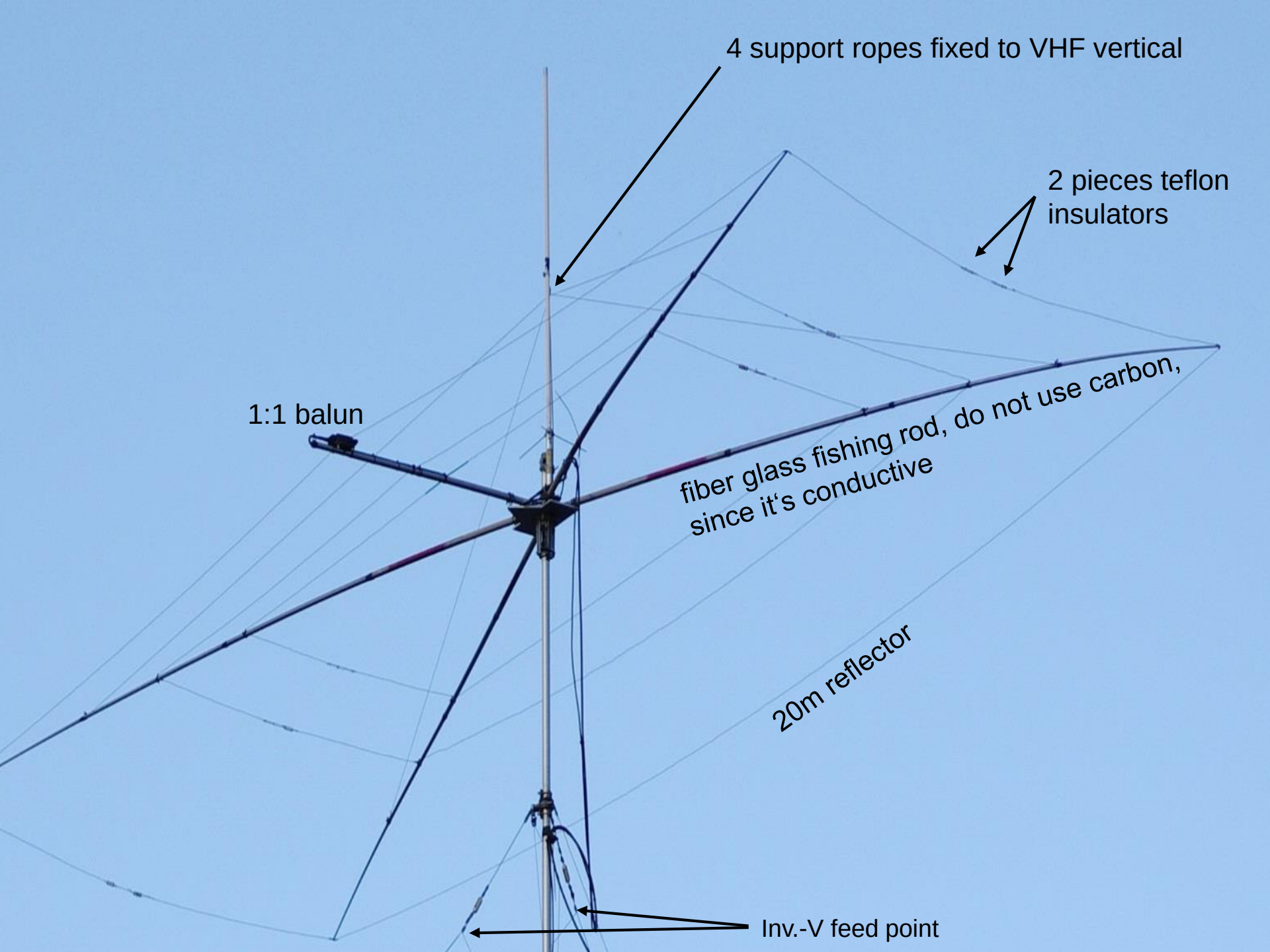
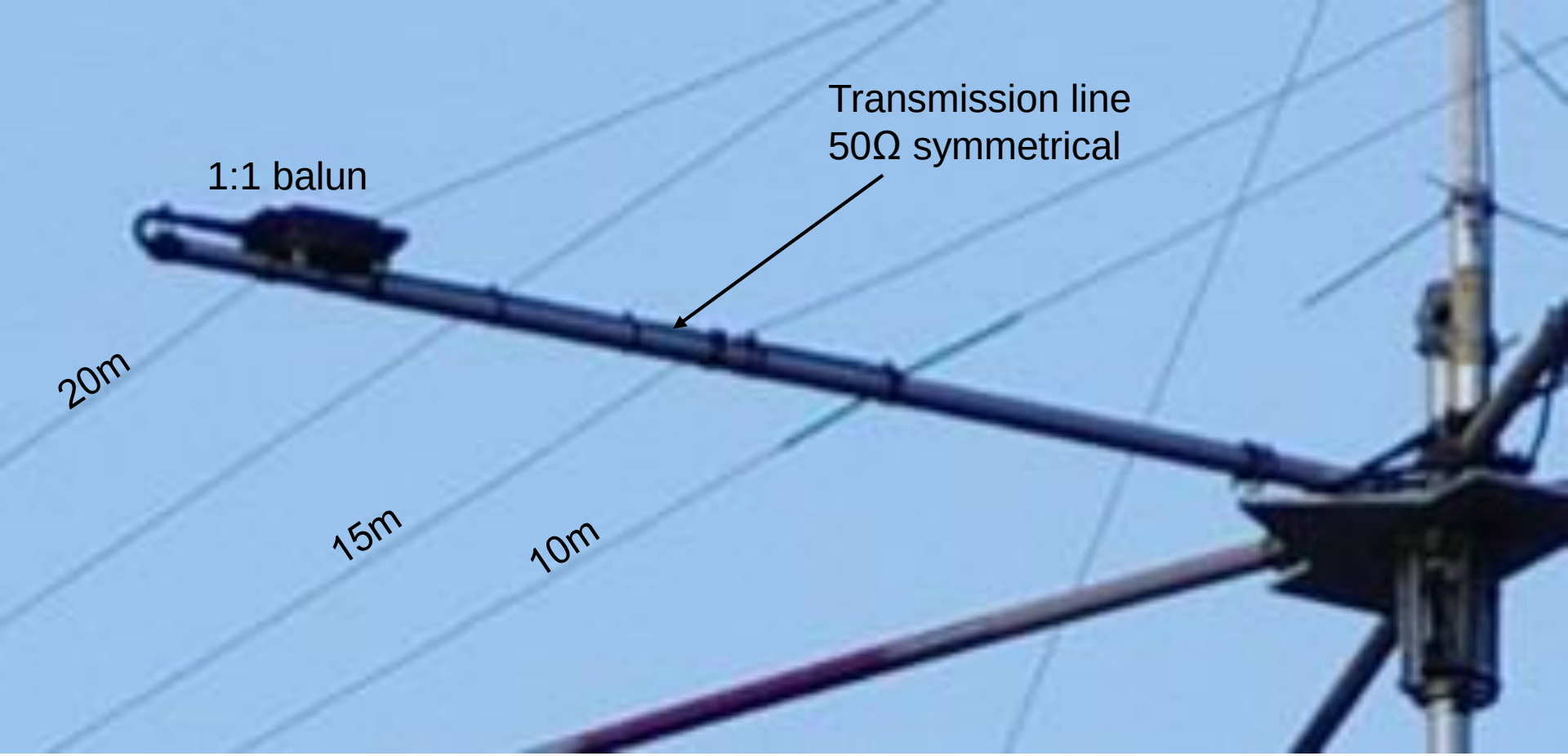
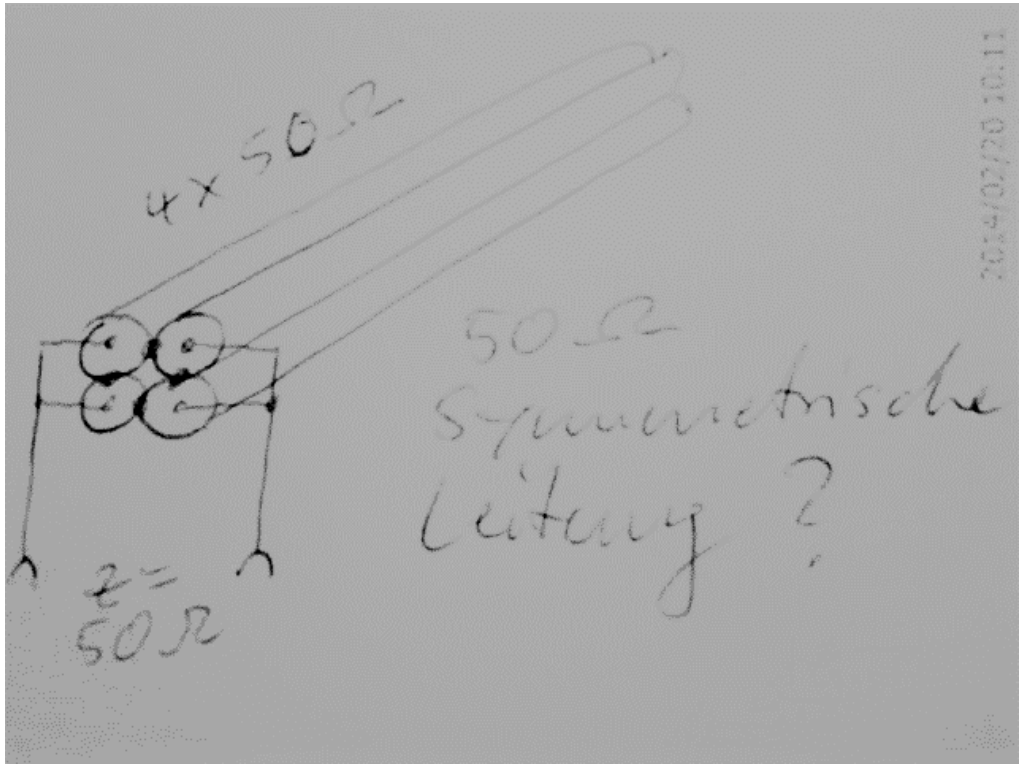

4 support ropes fixed to VHF vertical
2 pieces teflon insulators
1:1 balun
fiber glass fishing rod, do not use carbon, since it‘s conductive
20m reflector
Inv.-V feed point



The three dipoles are connected to the parallel transmission line, fed by the balun.

Connecting the three dipoles together…

. . . because I prefer a single feed line for all three bands.

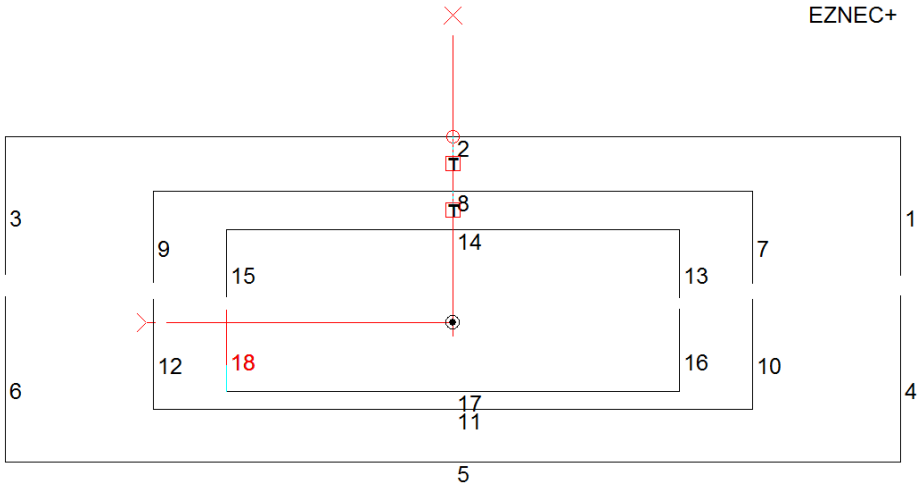


The 50 Ω transmission line is made out of two pairs standard 50 Ω Coax Cable. Do **not** use standard symmetric cable with some hundred Ω impedance. This will end up in unwanted transformation and in detuned Moxon, unexpected directivity included. I`ve been down to this road ☺

Dimensions…

Dimensions might not be fully optimized, however, it works fine for me.

Note the small distance between wire #11 and #17 (reflectors for 10 and 15m)



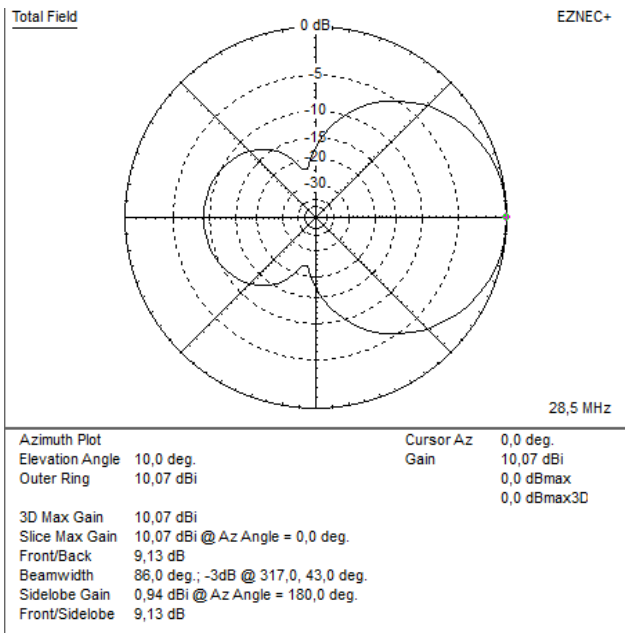
No.	End 1				End 2				Diameter	Segs	Insulation	
	X (m)	Y (m)	Z (m)	Conn	X (m)	Y (m)	Z (m)	Conn	(mm)		Diel C	Thk (mm)
1	0,6029	-3,85525	14		1,7904	-3,85525	14	W2E1	1,5	4	1	0
2	1,7904	-3,85525	14	W1E2	1,7904	3,85525	14	W3E1	1,5	27	1	0
3	1,7904	3,85525	14	W2E2	0,6029	3,85525	14		1,5	4	1	0
4	0,4242	-3,85525	14		-1	-3,85525	14	W5E1	1,5	5	1	0
5	-1	-3,85525	14	W4E2	-1	3,85525	14	W6E1	1,5	26	1	0
6	-1	3,85525	14	W5E2	0,4242	3,85525	14		1,5	5	1	0
7	0,5322	-2,5794	14		1,3222	-2,5794	14	W8E1	1,5	3	1	0
8	1,3222	-2,5794	14	W7E2	1,3222	2,57945	14	W9E1	1,5	19	1	0
9	1,3222	2,57945	14	W8E2	0,5322	2,57945	14		1,5	3	1	0
10	-0,55	-2,5794	14	W11E1	0,4064	-2,5794	14		1,5	4	1	0
11	-0,55	-2,5794	14	W10E1	-0,55	2,57945	14	W12E1	1,5	18	1	0
12	-0,55	2,57945	14	W11E2	0,4064	2,57945	14		1,5	4	1	0
13	0,4104	-1,95	14		0,9942	-1,95	14	W14E1	1,5	2	1	0
14	0,9942	-1,95	14	W13E2	0,9942	1,95	14	W15E1	1,5	13	1	0
15	0,9942	1,95	14	W14E2	0,4104	1,95	14		1,5	2	1	0
16	0,3128	-1,95	14		-0,4	-1,95	14	W17E1	1,5	3	1	0
17	-0,4	-1,95	14	W16E2	-0,4	1,95	14	W18E1	1,5	13	1	0
18	-0,4	1,95	14	W17E2	0,3128	1,95	14		1,5	3	1	0

20

15

10

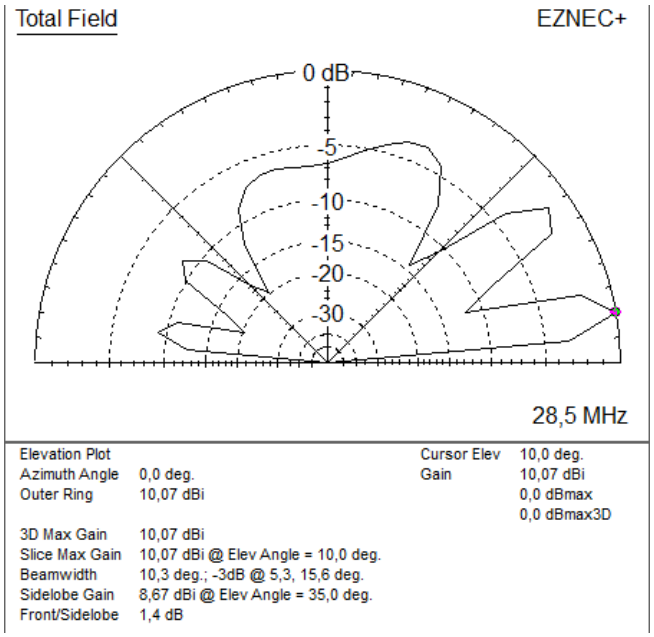
Expectations… 10m band



Azimuth Plot
Elevation Angle 10,0 deg.
Outer Ring 10,07 dBi

3D Max Gain 10,07 dBi
Slice Max Gain 10,07 dBi @ Az Angle = 0,0 deg.
Front/Back 9,13 dB
Beamwidth 86,0 deg.; -3dB @ 317,0, 43,0 deg.
Sidelobe Gain 0,94 dBi @ Az Angle = 180,0 deg.
Front/Sidelobe 9,13 dB

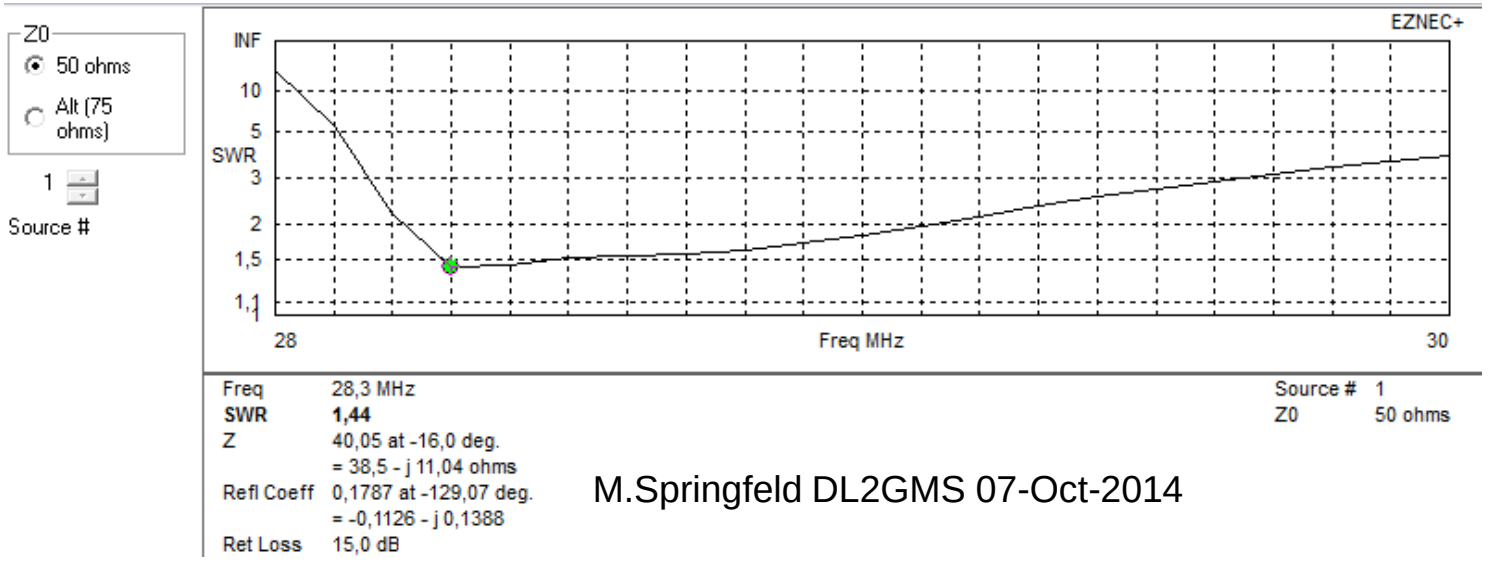
Cursor Az 0,0 deg.
Gain 10,07 dBi
0,0 dBmax
0,0 dBmax3D



Elevation Plot
Azimuth Angle 0,0 deg.
Outer Ring 10,07 dBi

3D Max Gain 10,07 dBi
Slice Max Gain 10,07 dBi @ Elev Angle = 10,0 deg.
Beamwidth 10,3 deg.; -3dB @ 5,3, 15,6 deg.
Sidelobe Gain 8,67 dBi @ Elev Angle = 35,0 deg.
Front/Sidelobe 1,4 dB

Cursor Elev 10,0 deg.
Gain 10,07 dBi
0,0 dBmax
0,0 dBmax3D



Freq 28,3 MHz
SWR **1,44**
Z 40,05 at -16,0 deg.
= 38,5 - j 11,04 ohms
Refl Coeff 0,1787 at -129,07 deg.
= -0,1126 - j 0,1388
Ret Loss 15,0 dB

Source # 1
Z0 50 ohms

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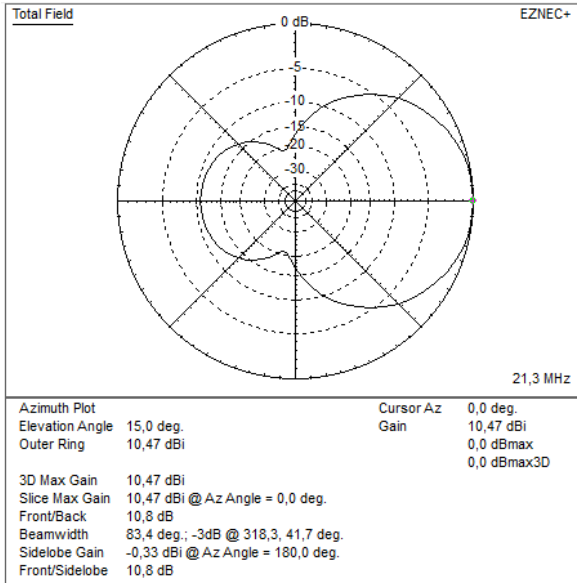
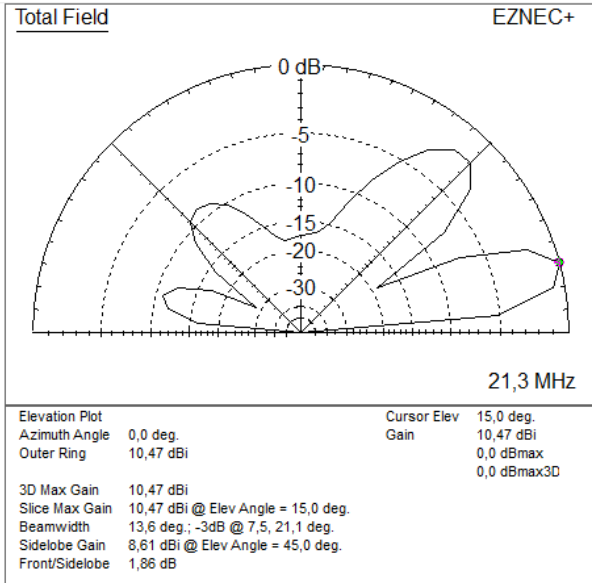
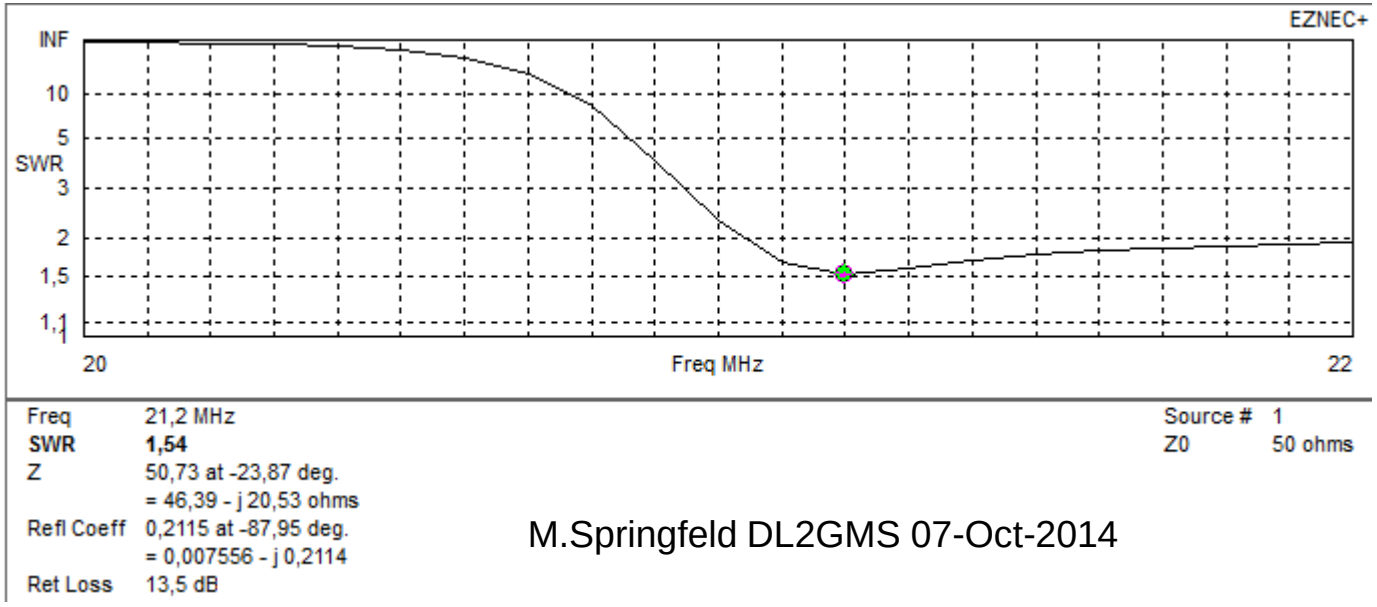
Expectations… 15m band







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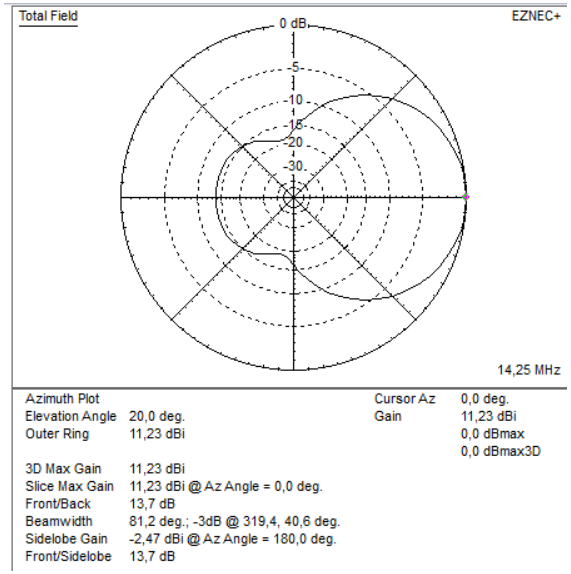
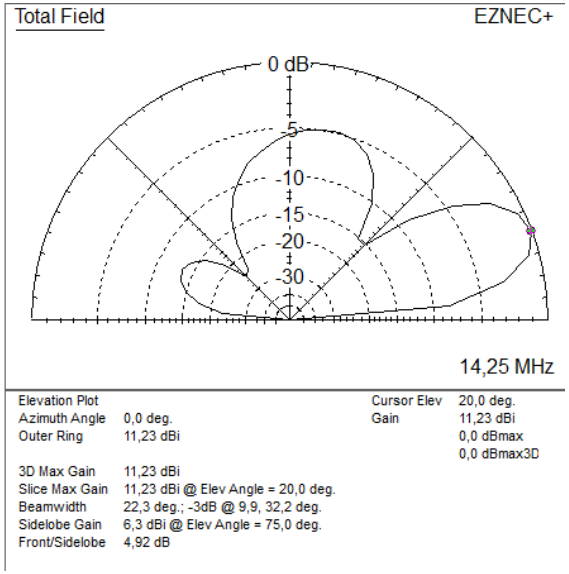
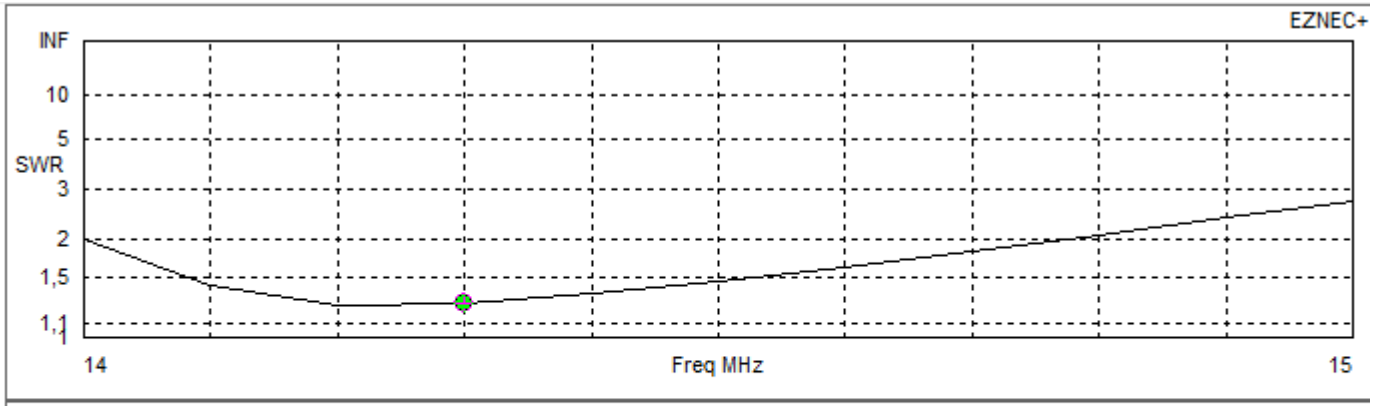
Expectations… 20m band



Azimuth Plot		Cursor Az	0,0 deg.
Elevation Angle	20,0 deg.	Gain	11,23 dBi
Outer Ring	11,23 dBi		0,0 dBmax
			0,0 dBmax3D
3D Max Gain	11,23 dBi		
Slice Max Gain	11,23 dBi @ Az Angle = 0,0 deg.		
Front/Back	13,7 dB		
Beamwidth	81,2 deg.; -3dB @ 319,4, 40,6 deg.		
Sidelobe Gain	-2,47 dBi @ Az Angle = 180,0 deg.		
Front/Sidelobe	13,7 dB		



Elevation Plot		Cursor Elev	20,0 deg.
Azimuth Angle	0,0 deg.	Gain	11,23 dBi
Outer Ring	11,23 dBi		0,0 dBmax
			0,0 dBmax3D
3D Max Gain	11,23 dBi		
Slice Max Gain	11,23 dBi @ Elev Angle = 20,0 deg.		
Beamwidth	22,3 deg.; -3dB @ 9,9, 32,2 deg.		
Sidelobe Gain	6,3 dBi @ Elev Angle = 75,0 deg.		
Front/Sidelobe	4,92 dB		



Freq	14,3 MHz	Source #	1
SWR	**1,26**	Z0	50 ohms
Z	58,59 at -9,67 deg.		
	= 57,75 - j 9,841 ohms		
Refl Coeff	0,1158 at -46,55 deg.		
	= 0,07963 - j 0,08405		
Ret Loss	18,7 dB		

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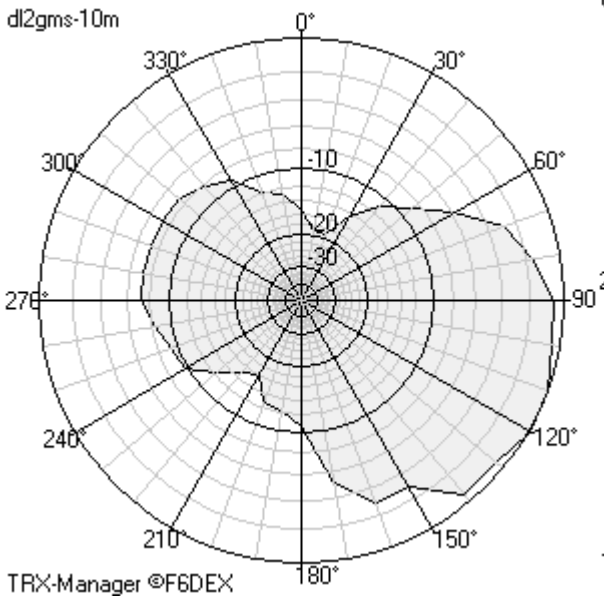
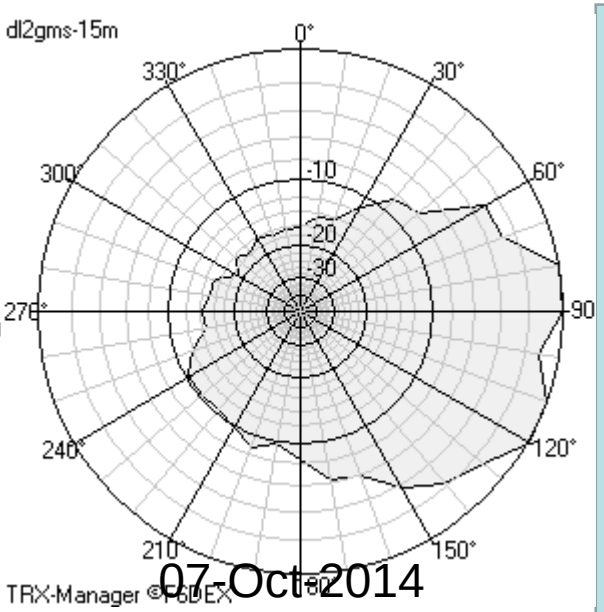
…Reality…

measured pattern, ground wave, rcv. stn. DK0TE, distance 17km, bearing 112°





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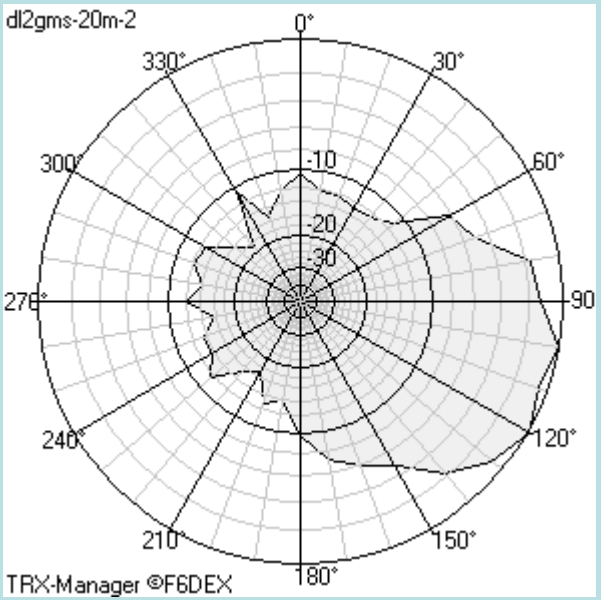
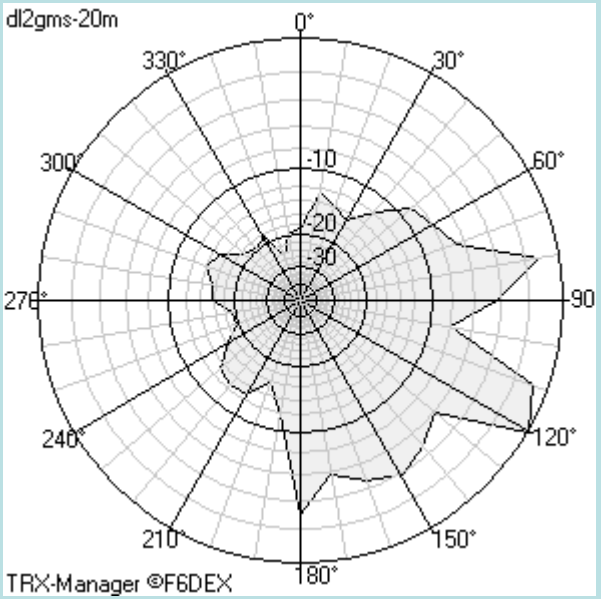


Inv.-V feed line without short circuit:



The 2 diagrams on 20m band show the interaction with the inv-V, mounted below the Moxon. Inv.-V feed line with and without short circuit.

Measurements performed with the great support of Hardy, DL1GLH and DK2WT for earlier draft pattern records.

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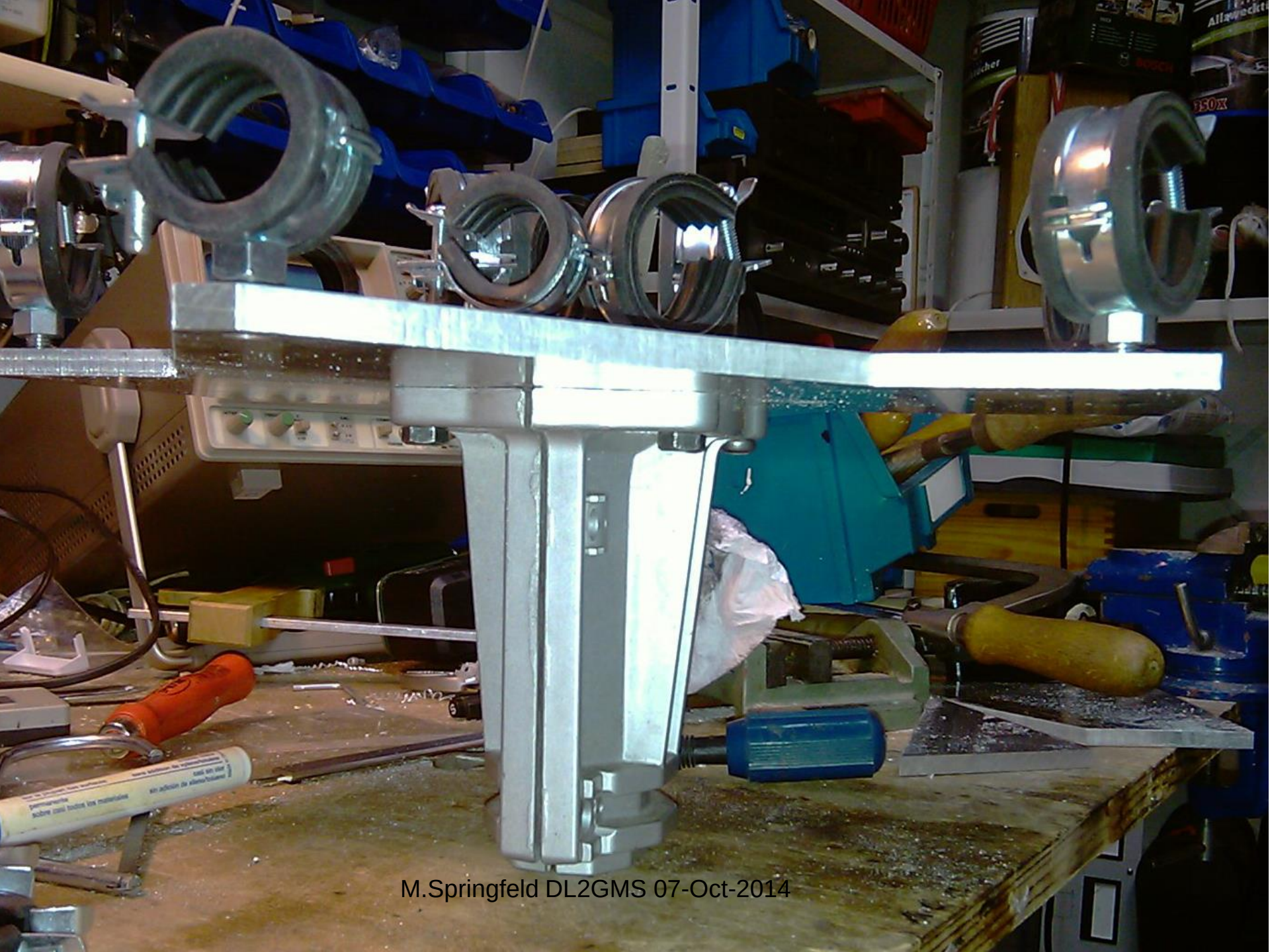
Old rotor adapter
10mm aluminium plate
2012/04/01 19:48


2012/04/09 18:23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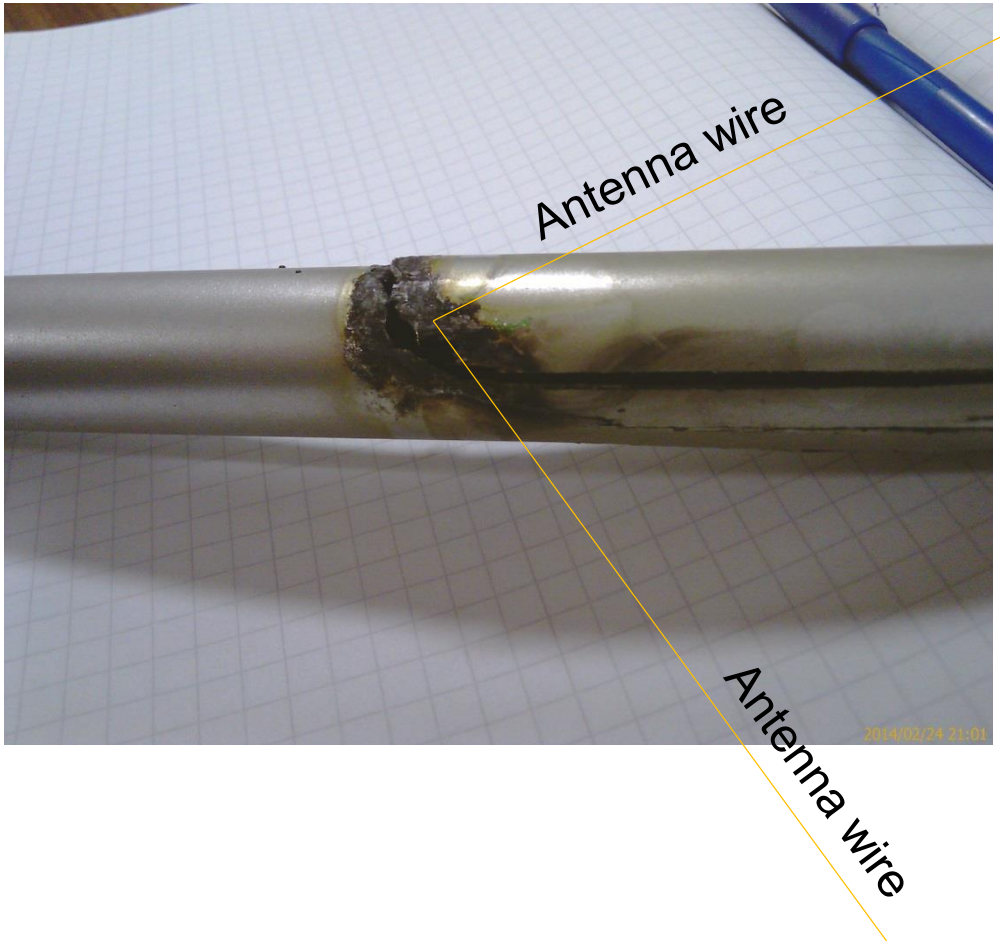
Power… maybe a bit too much…

…with a nice dielectric breakdown…



…followed by a mechanical failure of one fibre rod…

…therefore, the use of ***adequate insulation material*** between the antenna wire and fiber rod is recommended