

CM ON5VL triangular tower with guy wires and ground radials

CM Design by KJ4EGU - Carlo Francescangeli

CM Full parametric version

CM Software : 4NEC2 by Arie VOORS (freeware)

CM auto segmentation 50

CM Metric units

CM Feb / 2024

CE

SY f=7

'f (MHz)

SY wl=300/f

'Wavelength (m)

SY a=33cm

'tower side

SY b=a/2/sqr(3)

'Y axis direction spacing

SY c=55cm

'tower module height

SY rad1=12mm

'tower metallic element radius

SY h=45

'total height tower (m)

SY n=int(h/c)

'module number

SY s=40cm

'concrete base height

SY lh=13.5

'guy wire distance from tower (m)

SY lrad=wl/2

'radial length (m)

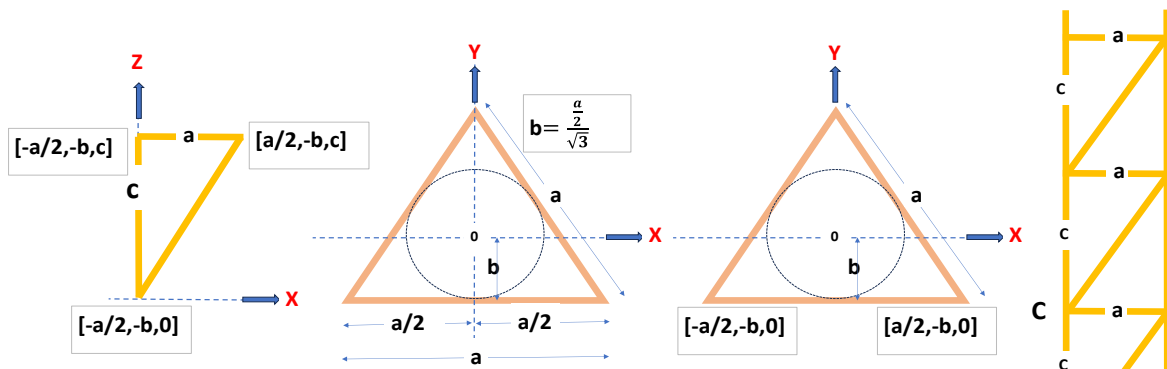
SY nrad=18

'radials numbers

GW	1	1	-a/2	-b	0	-a/2	-b	c	rad1	
GW	2	1	-a/2	-b	c	a/2	-b	c	rad1	
GW	3	1	-a/2	-b	0	a/2	-b	c	rad1	
GM	0	2	0	0	120	0	0	0	1	
GM	0	n	0	0	0	0	0	c	1	
GW	1000	10	0	lh	0	0	2*b	30*c	3mm	
GW	1001	10	0	lh	0	0	2*b	65*c	3mm	
GM	0	2	0	0	120	0	0	0	1000	
GM	0	0	0	0	0	0	0	s	1	
GW	1500	10	0	2*a	0	0	lrad	0	1mm	
GM	0	nrad-1	0	0	360/nrad	0	0	0	0	1500
GA	2000	nrad	2.a	0	360	1mm				
GM	0	0	90	0	0	0	0	0	2000	
GE	-1									
GN	1									
EK										
FR	0	0	0	0	f	0				
EN										



**CONFIDENTIAL**



**CONFIDENTIAL**

SY f=7		'f (MHz)
SY wl=300/f		'Wavelength (m)
SY a=33cm		'tower side
SY b=a/2/sqr(3)		'Y axis direction spacing
SY c=55cm		'tower module height
SY rad1=12mm		'tower metallic element radius
SY h=45		'total height tower
SY n=int(h/c)		'module number
SY s=40cm		'concrete base height
SY lh=13.5		'guy wire distance from tower (m)
SY lrad=wl/2		'radial length (m)
SY nrad=18		'radials numbers

GW	1	1	-a/2	-b	0	-a/2	-b	c	rad1	
GW	2	1	-a/2	-b	c	a/2	-b	c	rad1	
GW	3	1	-a/2	-b	0	a/2	-b	c	rad1	
GM	0	2	0	0	120	0	0	0	1	
GM	0	n	0	0	0	0	0	c	1	
GW	1000	10	0	lh	0	0	2*b	30*c	3mm	
GW	1001	10	0	lh	0	0	2*b	65*c	3mm	
GM	0	2	0	0	120	0	0	0	1000	
GM	0	0	0	0	0	0	0	s	1	
GW	1500	10	0	2*a	0	0	lrad	0	1mm	
GM	0	nrad-1	0	0	360/nrad	0	0	0	0	1500
GA	2000	nrad	2.a	0	360	1mm				
GM	0	0	90	0	0	0	0	0	2000.	

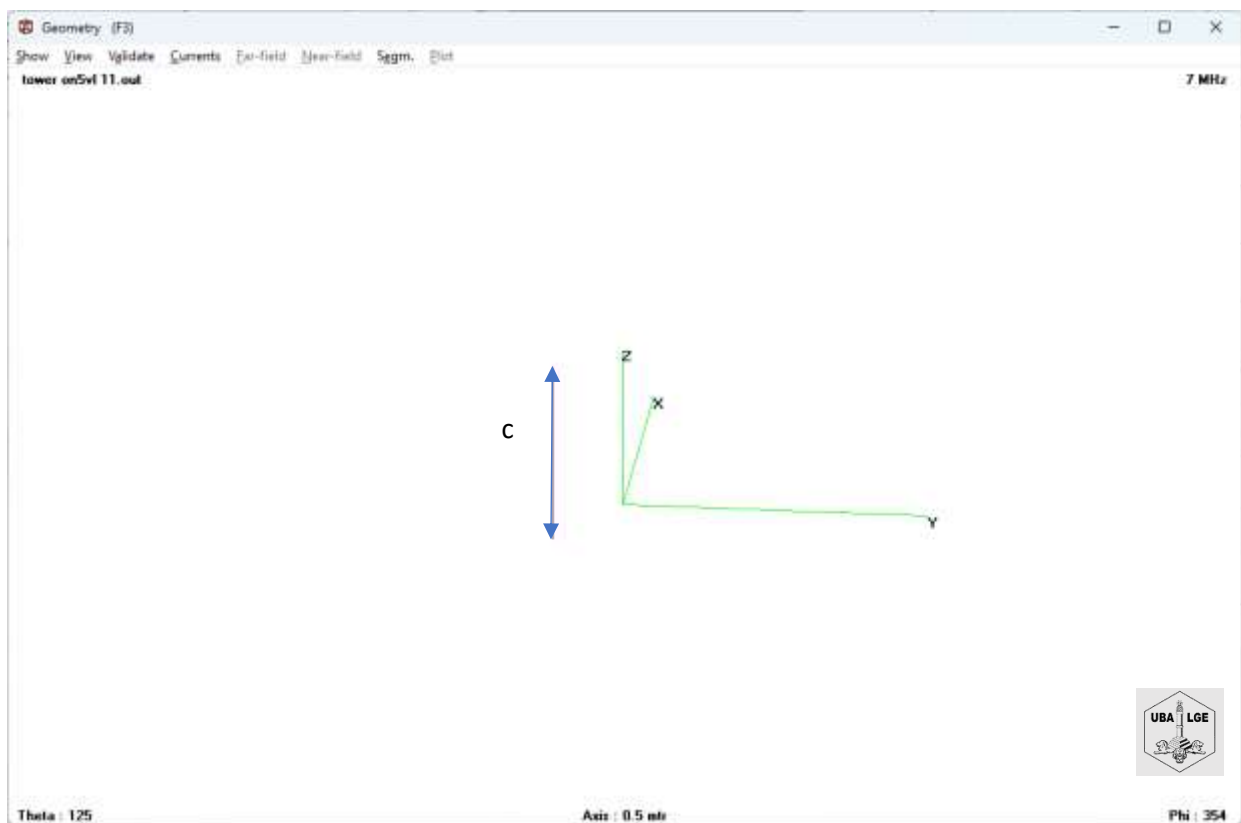


Fig 1: construction montant vertical source: KJ4EGU

SY f=7		'f (MHz)								
SY wl=300/f		'Wavelength (m)								
SY a=33cm		'tower side								
SY b=a/2/sqr(3)		'Y axis direction spacing								
SY c=55cm		'tower module height								
SY rad1=12mm		'tower metallic element radius								
SY h=45		'total height tower								
SY n=int(h/c)		'module number								
SY s=40cm		'concrete base height								
SY lh=13.5		'guy wire distance from tower (m)								
SY lrad=wl/2		'radial length (m)								
SY nrad=18		'radials numbers								
GW 1 1 1	-a/2	-b	0	-a/2	-b	c	rad1			
GW 2 1 1	-a/2	-b	c	a/2	-b	c	rad1			
GW 3 1 1	-a/2	-b	0	a/2	-b	c	rad1			
GM 0 2 0	0	0	120	0	0	0	1			
GM 0 n 0	0	0	0	0	0	c	1			
GW 1000 10 0	lh	0	0	2*b	30*c	3mm				
GW 1001 10 0	lh	0	0	2*b	65*c	3mm				
GM 0 2 0	0	0	120	0	0	0	1000			
GM 0 0 0	0	0	0	0	0	s	1			
GW 1500 10 0	2*a	0	0	lrad	0	1mm				
GM 0 nrad-1 0	0	0	360/nrad	0	0	0	0	1500		
GA 2000 nrad 2.a 0 360 1mm										
GM 0 0 90 0 0 0 0 0 2000										

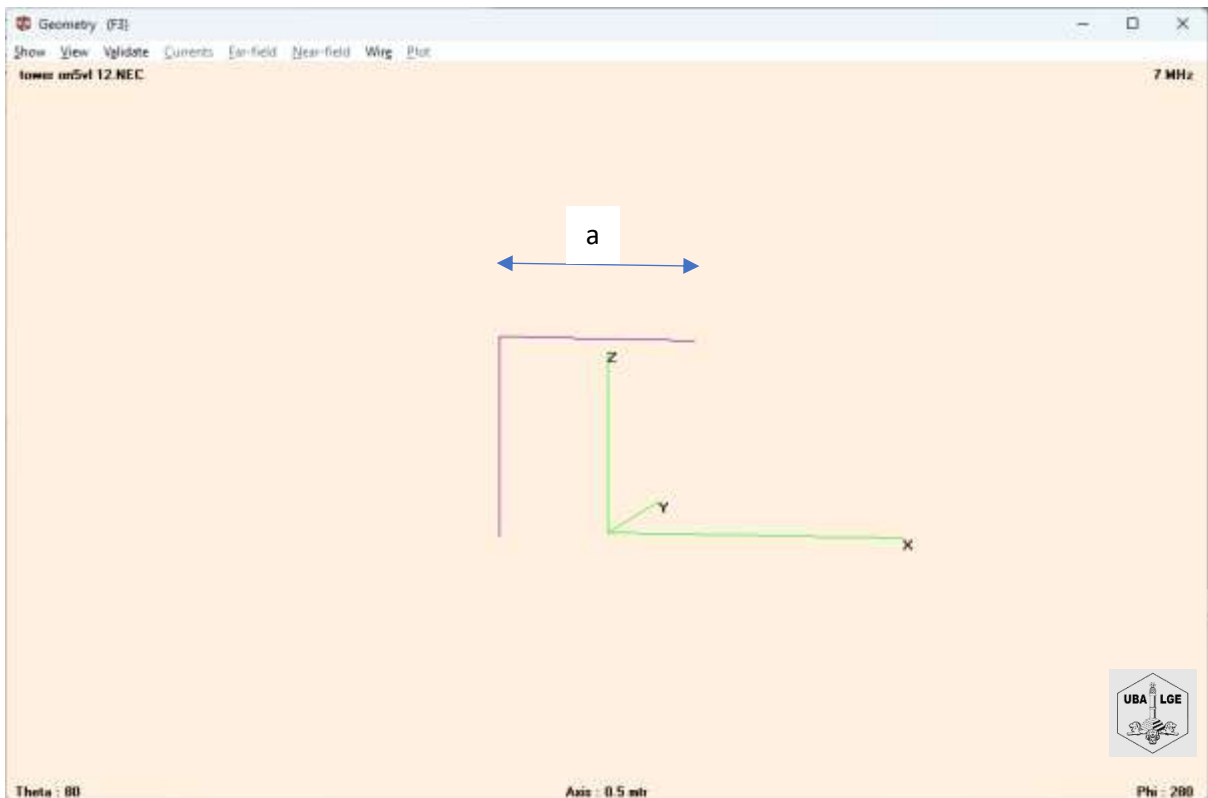


Fig 2: construction barre horizontale

source: KJ4EGU

SY f=7		'f (MHz)								
SY wl=300/f		'Wavelength (m)								
SY a=33cm		'tower side								
SY b=a/2/sqr(3)		'Y axis direction spacing								
SY c=55cm		'tower module height								
SY rad1=12mm		'tower metallic element radius								
SY h=45		'total height tower								
SY n=int(h/c)		'module number								
SY s=40cm		'concrete base height								
SY lh=13.5		'guy wire distance from tower (m)								
SY lrad=wl/2		'radial length (m)								
SY nrad=18		'radials numbers								
GW 1 1 1	-a/2	-b	0	-a/2	-b	c	rad1			
GW 2 1 1	-a/2	-b	c	a/2	-b	c	rad1			
GW 3 1 1	-a/2	-b	0	a/2	-b	c	rad1			
GM 0 2 0	0	0	120	0	0	0	1			
GM 0 n 0	0	0	0	0	0	c	1			
GW 1000 10 0	lh	0	0	2*b	30*c	3mm				
GW 1001 10 0	lh	0	0	2*b	65*c	3mm				
GM 0 2 0	0	0	120	0	0	0	1000			
GM 0 0 0	0	0	0	0	0	s	1			
GW 1500 10 0	2*a	0	0	lrad	0	1mm				
GM 0 nrad-1 0	0	0	360/nrad	0	0	0	0	1500		
GA 2000 nrad 2.a 0 360 1mm										
GM 0 0 90 0 0 0 0 0 2000										

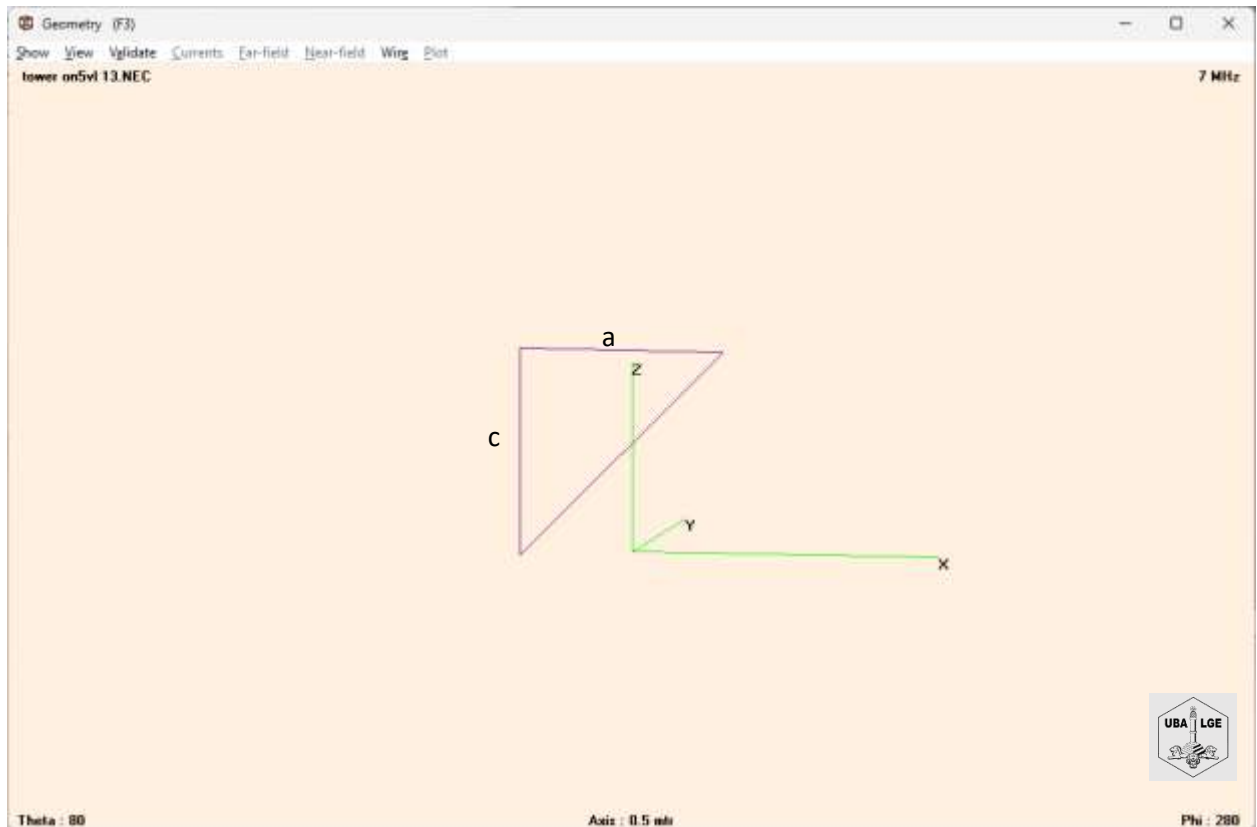


Fig 3: construction barre oblique source: KJ4EGU

SY f=7		'f (MHz)								
SY wl=300/f		'Wavelength (m)								
SY a=33cm		'tower side								
SY b=a/2/sqr(3)		'Y axis direction spacing								
SY c=55cm		'tower module height								
SY rad1=12mm		'tower metallic element radius								
SY h=45		'total height tower								
SY n=int(h/c)		'module number								
SY s=40cm		'concrete base height								
SY lh=13.5		'guy wire distance from tower (m)								
SY lrad=wl/2		'radial length (m)								
SY nrad=18		'radials numbers								
GW 1 1 1	-a/2	-b	0	-a/2	-b	c	rad1			
GW 2 1 1	-a/2	-b	c	a/2	-b	c	rad1			
GW 3 1 1	-a/2	-b	0	a/2	-b	c	rad1			
GM 0 2 0	0	0	120	0	0	0	1			
GM 0 n 0	0	0	0	0	0	c	1			
GW 1000 10 0	lh	0	0	2*b	30*c	3mm				
GW 1001 10 0	lh	0	0	2*b	65*c	3mm				
GM 0 2 0	0	0	120	0	0	0	1000			
GM 0 0 0	0	0	0	0	0	s	1			
GW 1500 10 0	2*a	0	0	lrad	0	1mm				
GM 0 nrad-1 0	0	0	360/nrad	0	0	0	0	1500		
GA 2000 nrad 2.a 0 360 1mm										
GM 0 0 90 0 0 0 0 0 2000										

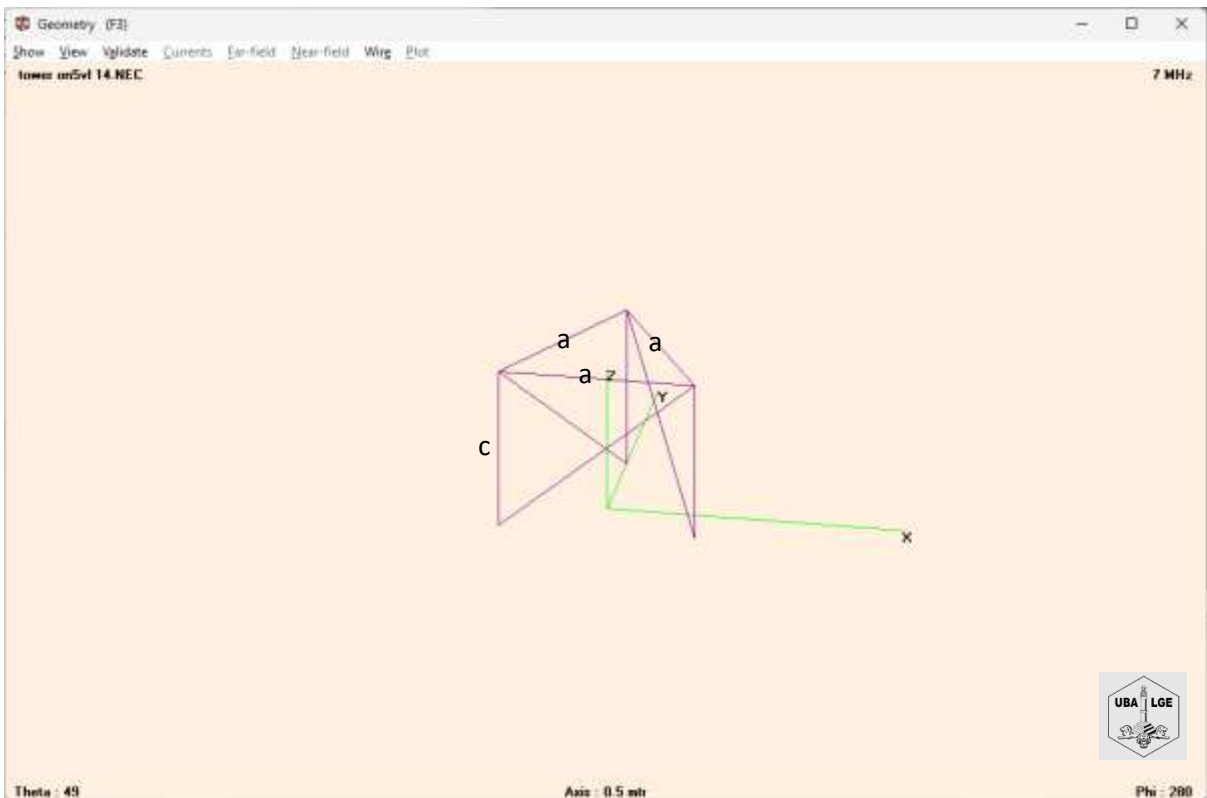


Fig 4: construction module #1

source: KJ4EGU

SY f=7		'f (MHz)								
SY wl=300/f		'Wavelength (m)								
SY a=33cm		'tower side								
SY b=a/2/sqr(3)		'Y axis direction spacing								
SY c=55cm		'tower module height								
SY rad1=12mm		'tower metallic element radius								
SY h=45		'total height tower								
SY n=int(h/c)		'module number								
SY s=40cm		'concrete base height								
SY lh=13.5		'guy wire distance from tower (m)								
SY lrad=wl/2		'radial length (m)								
SY nrad=18		'radials numbers								
GW 1 1 1	-a/2	-b	0	-a/2	-b	c	rad1			
GW 2 1 1	-a/2	-b	c	a/2	-b	c	rad1			
GW 3 1 1	-a/2	-b	0	a/2	-b	c	rad1			
GM 0 2 0	0	0	120	0	0	0	1			
GM 0 n 0	0	0	0	0	0	c	1			
GW 1000 10 0	lh	0	0	2*b	30*c	3mm				
GW 1001 10 0	lh	0	0	2*b	65*c	3mm				
GM 0 2 0	0	0	120	0	0	0	1000			
GM 0 0 0	0	0	0	0	0	s	1			
GW 1500 10 0	2*a	0	0	lrad	0	1mm				
GM 0 nrad-1 0	0	0	360/nrad	0	0	0	0	1500		
GA 2000 nrad 2.a 0 360 1mm										
GM 0 0 90 0 0 0 0 0 2000										

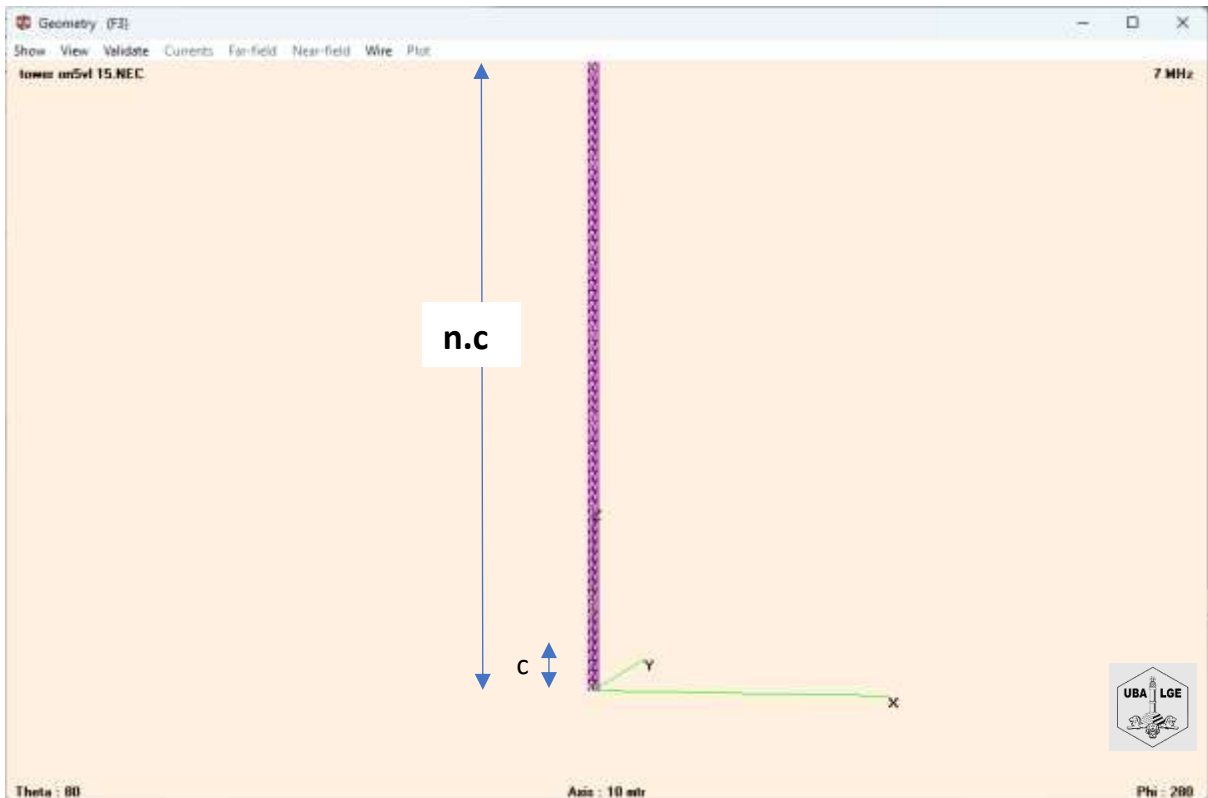


Fig 5a: construction n modules – hauteur totale source: KJ4EGU

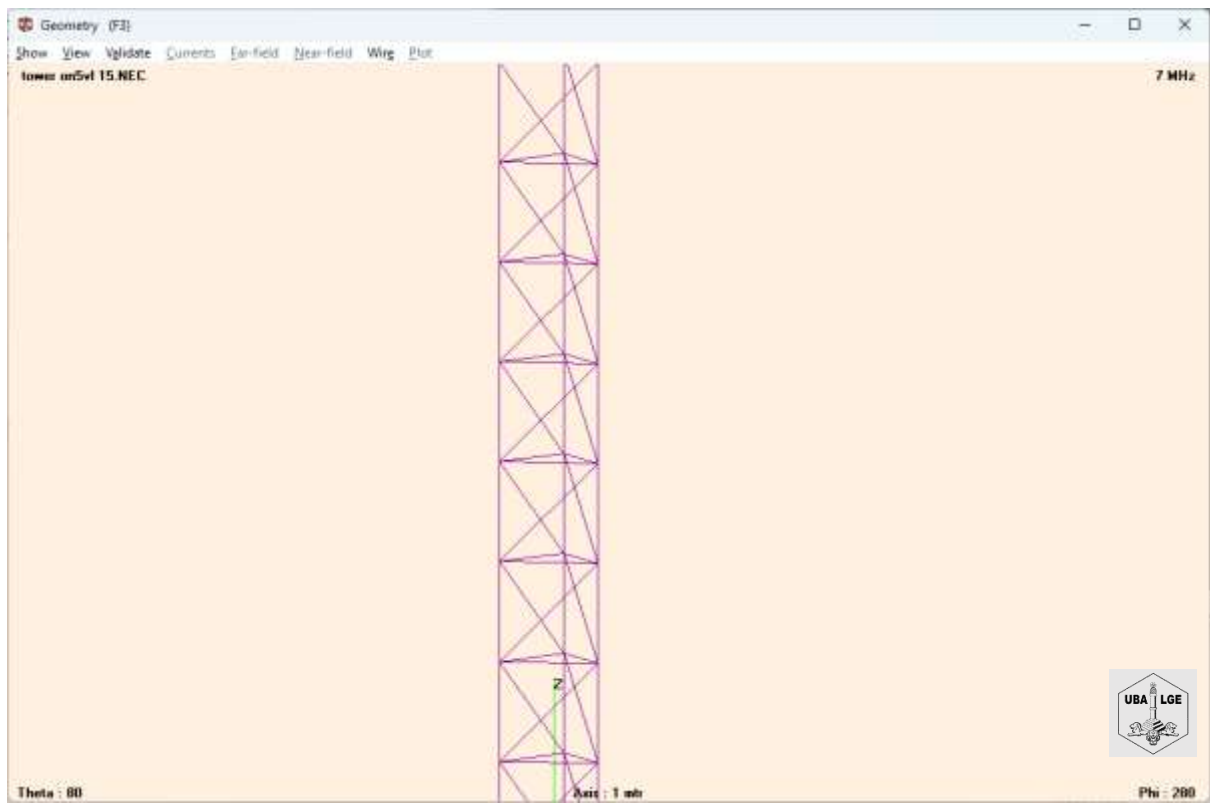


Fig 5b: construction n modules – hauteur totale source: KJ4EGU

SY f=7		'f (MHz)								
SY wl=300/f		'Wavelength (m)								
SY a=33cm		'tower side								
SY $b=a/2/\text{sqrt}(3)$		'Y axis direction spacing								
SY c=55cm		'tower module height								
SY rad1=12mm		'tower metallic element radius								
SY h=45		'total height tower								
SY n=int(h/c)		'module number								
SY s=40cm		'concrete base height								
SY lh=13.5		'guy wire distance from tower (m)								
SY lrad=wl/2		'radial length (m)								
SY nrad=18		'radials numbers								
GW 1 1 1	-a/2	-b	0	-a/2	-b	c	rad1			
GW 2 1 1	-a/2	-b	c	a/2	-b	c	rad1			
GW 3 1 1	-a/2	-b	0	a/2	-b	c	rad1			
GM 0 2 0	0	0	120	0	0	0	1			
GM 0 n 0	0	0	0	0	0	c	1			
GW 1000 10 0	lh	0	0	0	2*b	30*c	3mm			
GW 1001 10 0	lh	0	0	0	2*b	65*c	3mm			
GM 0 2 0	0	0	120	0	0	0	1000			
GM 0 0 0	0	0	0	0	0	s	1			
GW 1500 10 0	2*a	0	0	lrad	0	0	1mm			
GM 0 nrad-1 0	0	0	360/nrad	0	0	0	0		1500	
GA 2000 nrad 2.a 0 360 1mm										
GM 0 0 90 0 0 0 0 0 2000										

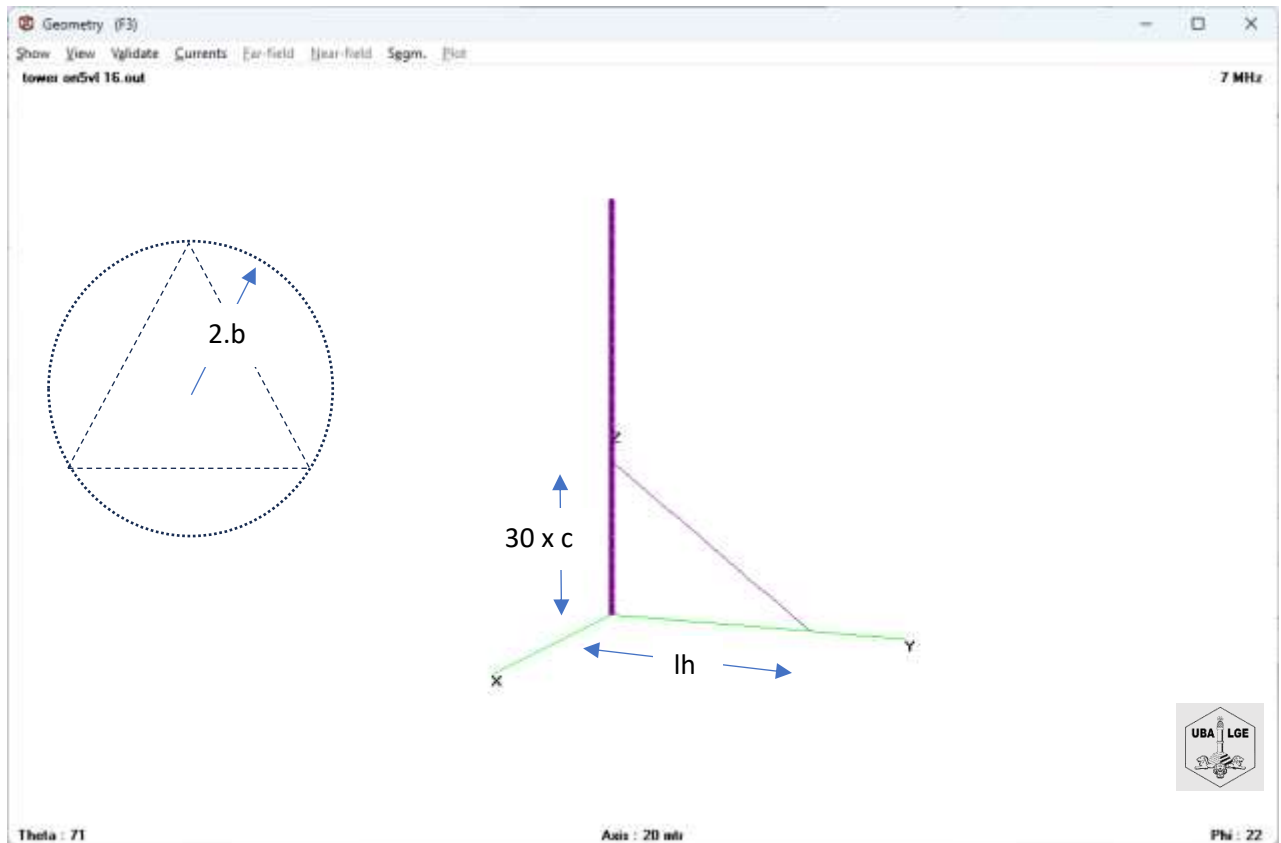


Fig 6: construction hauban inferieur

source: KJ4EGU



SY f=7		'f (MHz)								
SY wl=300/f		'Wavelength (m)								
SY a=33cm		'tower side								
SY <b>b=a/2/sqr(3)</b>		'Y axis direction spacing								
SY <b>c=55cm</b>		'tower module height								
SY rad1=12mm		'tower metallic element radius								
SY h=45		'total height tower								
SY n=int(h/c)		'module number								
SY s=40cm		'concrete base height								
SY <b>lh=13.5</b>		'guy wire distance from tower (m)								
SY lrad=wl/2		'radial length (m)								
SY nrad=18		'radials numbers								
GW 1 1 1	-a/2	-b	0	-a/2	-b	c	rad1			
GW 2 1 1	-a/2	-b	c	a/2	-b	c	rad1			
GW 3 1 1	-a/2	-b	0	a/2	-b	c	rad1			
GM 0 2 0	0	0	120	0	0	0	1			
GM 0 n 0	0	0	0	0	0	c	1			
GW 1000 10 0	lh	0	0	2*b	30*c	3mm				
GW 1001 10 0	lh	0	0	2*b	65*c	3mm				
GM 0 2 0	0	0	120	0	0	0	1000			
GM 0 0 0	0	0	0	0	0	s	1			
GW 1500 10 0	2*a	0	0	lrad	0	1mm				
GM 0 nrad-1 0	0	0	360/nrad	0	0	0	0	1500		
GA 2000 nrad 2.a 0 360 1mm										
GM 0 0 90 0 0 0 0 0 2000										

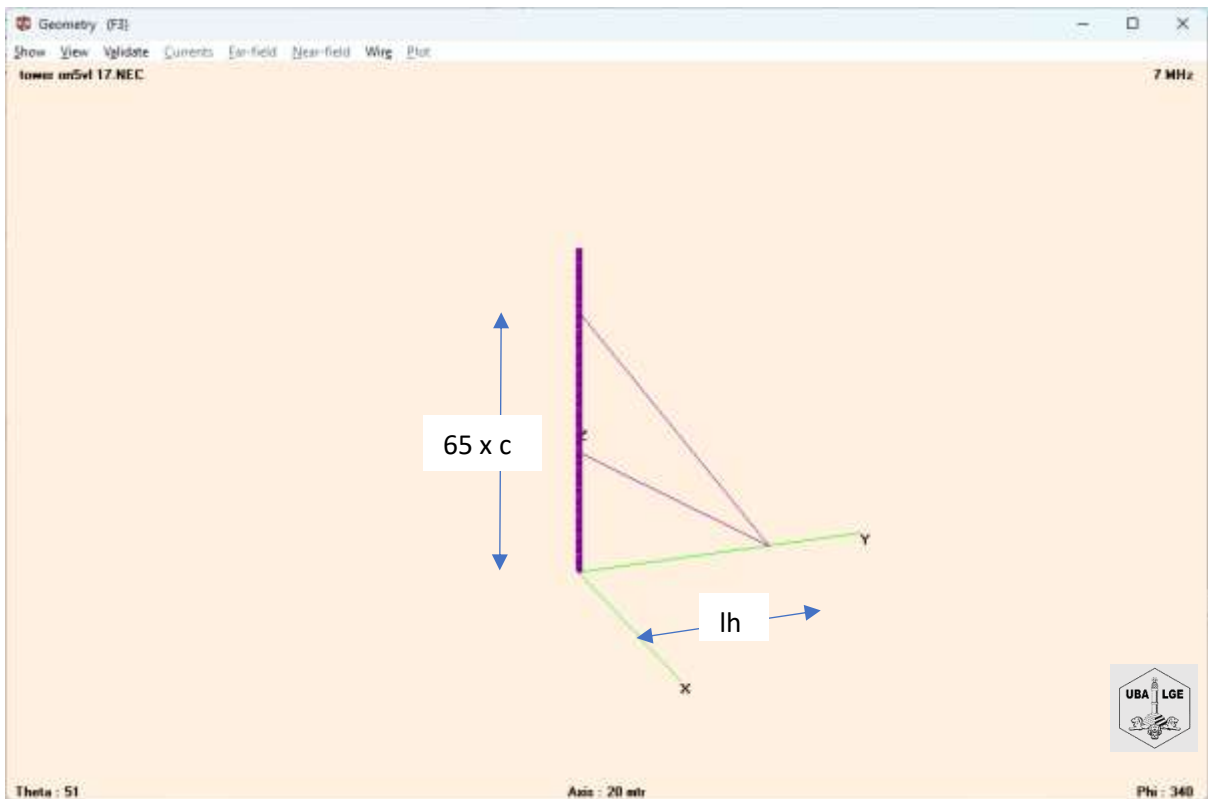


Fig 7: construction hauban superieur

source: KJ4EGU

SY f=7		'f (MHz)								
SY wl=300/f		'Wavelength (m)								
SY a=33cm		'tower side								
SY b=a/2/sqr(3)		'Y axis direction spacing								
SY c=55cm		'tower module height								
SY rad1=12mm		'tower metallic element radius								
SY h=45		'total height tower								
SY n=int(h/c)		'module number								
SY s=40cm		'concrete base height								
SY lh=13.5		'guy wire distance from tower (m)								
SY lrad=wl/2		'radial length (m)								
SY nrad=18		'radials numbers								
GW 1	1	1	-a/2	-b	0	-a/2	-b	c	rad1	
GW 2	1	1	-a/2	-b	c	a/2	-b	c	rad1	
GW 3	1	1	-a/2	-b	0	a/2	-b	c	rad1	
GM 0	2	1	0	0	120	0	0	0	1	
GM 0	n	1	0	0	0	0	0	c	1	
GW 1000	10	1	0	lh	0	0	2*b	30*c	3mm	
GW 1001	10	1	0	lh	0	0	2*b	65*c	3mm	
GM 0	2	1	0	0	120	0	0	0	1000	
GM 0	0	1	0	0	0	0	0	s	1	
GW 1500	10	1	0	2*a	0	0	lrad	0	1mm	
GM 0	nrad-1	1	0	0	360/nrad	0	0	0	0	1500
GA 2000	nrad	1	2.a	0	360	1mm				
GM 0	0	1	90	0	0	0	0	0	2000	

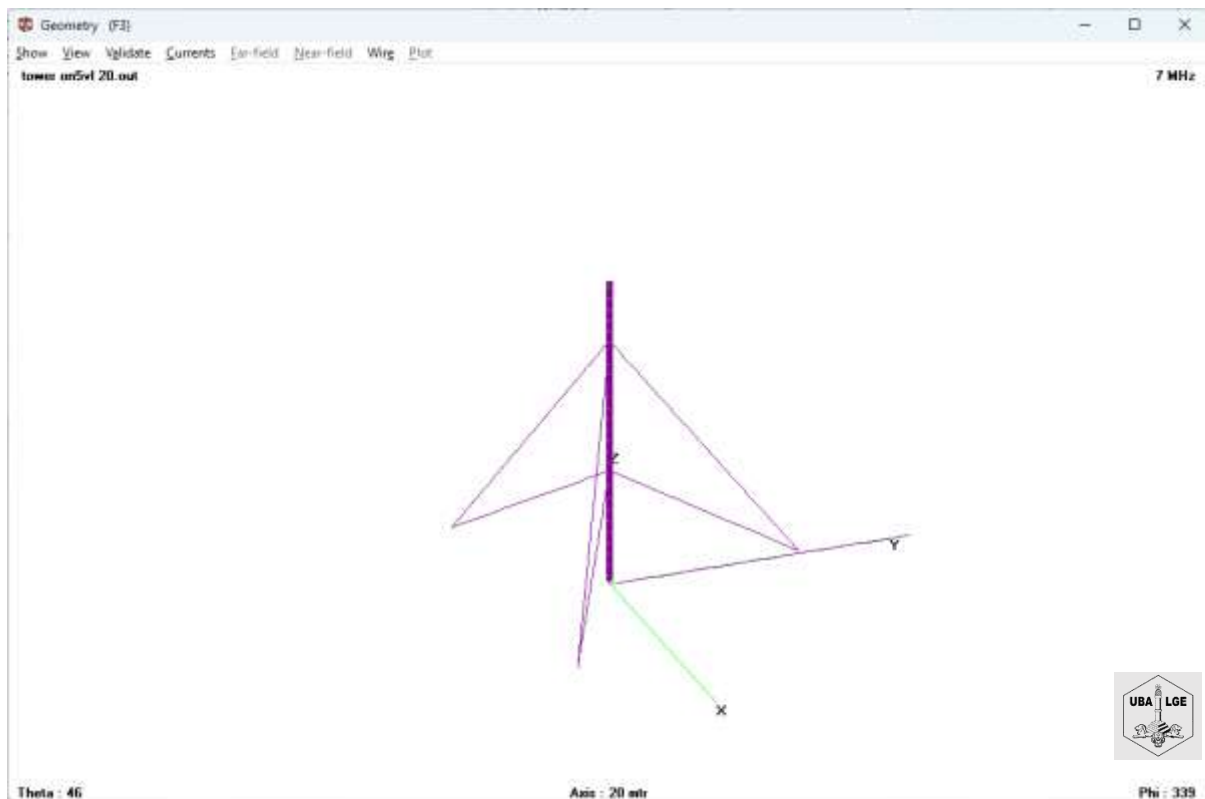


Fig 8: construction 6 haubans

source: KJ4EGU

SY f=7		'f (MHz)								
SY wl=300/f		'Wavelength (m)								
SY a=33cm		'tower side								
SY b=a/2/sqr(3)		'Y axis direction spacing								
SY c=55cm		'tower module height								
SY rad1=12mm		'tower metallic element radius								
SY h=45		'total height tower								
SY n=int(h/c)		'module number								
SY s=40cm		'concrete base height								
SY lh=13.5		'guy wire distance from tower (m)								
SY lrad=wl/2		'radial length (m)								
SY nrad=18		'radials numbers								
GW 1	1	1	-a/2	-b	0	-a/2	-b	c	rad1	
GW 2	1	1	-a/2	-b	c	a/2	-b	c	rad1	
GW 3	1	1	-a/2	-b	0	a/2	-b	c	rad1	
GM 0	2	0	0	0	120	0	0	0	1	
GM 0	n	0	0	0	0	0	0	c	1	
GW 1000	10	0	lh	0	0	0	2*b	30*c	3mm	
GW 1001	10	0	lh	0	0	0	2*b	65*c	3mm	
GM 0	2	0	0	0	120	0	0	0	1000	
GM 0	0	0	0	0	0	0	0	s	1	
GW 1500	10	0	2*a	0	0	0	lrad	0	1mm	
GM 0	nrad-1	0	0	0	360/nrad	0	0	0	0	1500
GA 2000	nrad	2.a	0	0	360	1mm				
GM 0	0	90	0	0	0	0	0	0	2000	

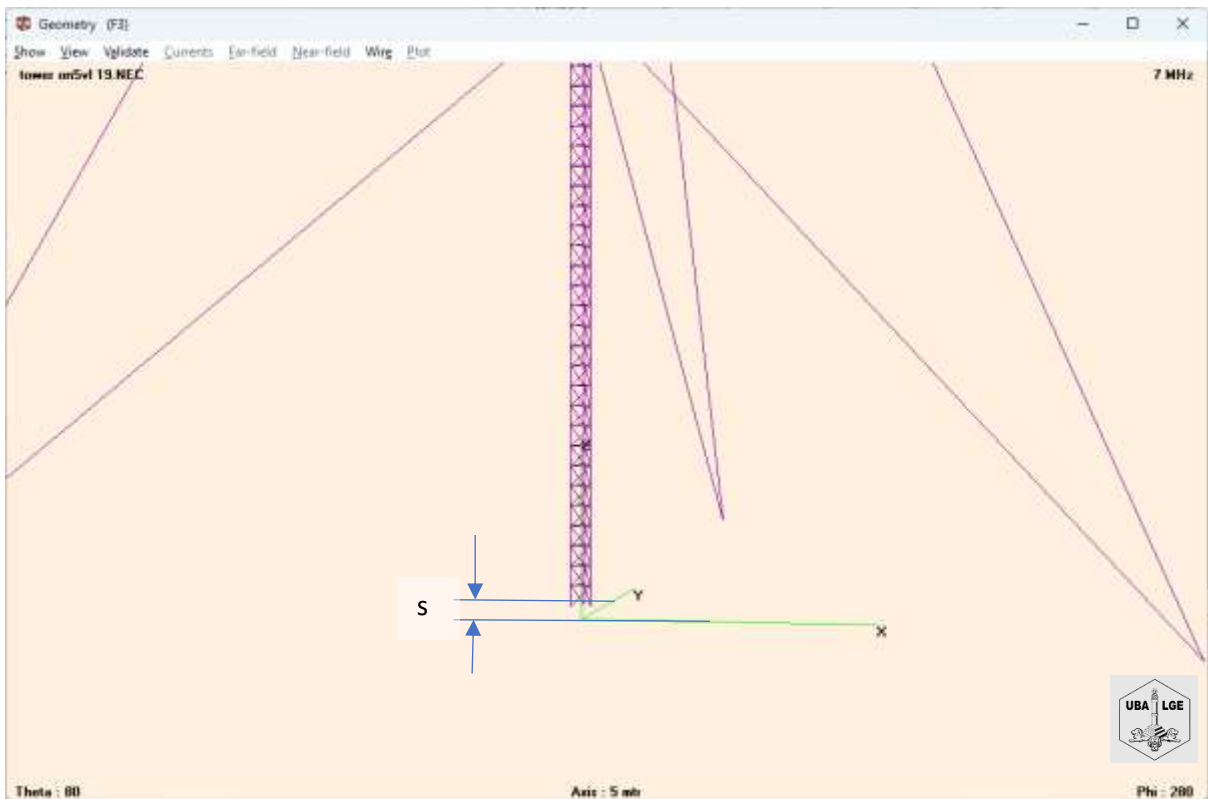


Fig 9: elevation du pylone sur le sol (dalle en beton)

source: KJ4EGU

SY f=7		'f (MHz)
SY wl=300/f		'Wavelength (m)
SY a=33cm		'tower side
SY b=a/2/sqr(3)		'Y axis direction spacing
SY c=55cm		'tower module height
SY rad1=12mm		'tower metallic element radius
SY h=45		'total height tower
SY n=int(h/c)		'module number
SY s=40cm		'concrete base height
SY lh=13.5		'guy wire distance from tower (m)
SY lrad=wl/2		'radial length (m)
SY nrad=18		'radials numbers
GW 1 1 1	-a/2 -b 0	-a/2 -b c rad1
GW 2 1 1	-a/2 -b c	a/2 -b c rad1
GW 3 1 1	-a/2 -b 0	a/2 -b c rad1
GM 0 2 2	0 0 120	0 0 0 1
GM 0 n n	0 0 0	0 0 c 1
GW 1000 10 10	0 lh 0	0 2*b 30*c 3mm
GW 1001 10 10	0 lh 0	0 2*b 65*c 3mm
GM 0 2 2	0 0 120	0 0 0 1000
GM 0 0 0	0 0 0	0 s 1
GW 1500 10 0	2*a 0 0	lrad 0 1mm
GM 0 nrad-1 0	0 360/nrad	0 0 0 1500
GA 2000 nrad	2.a 0 360	1mm
GM 0 0 90	0 0 0	0 0 0 2000

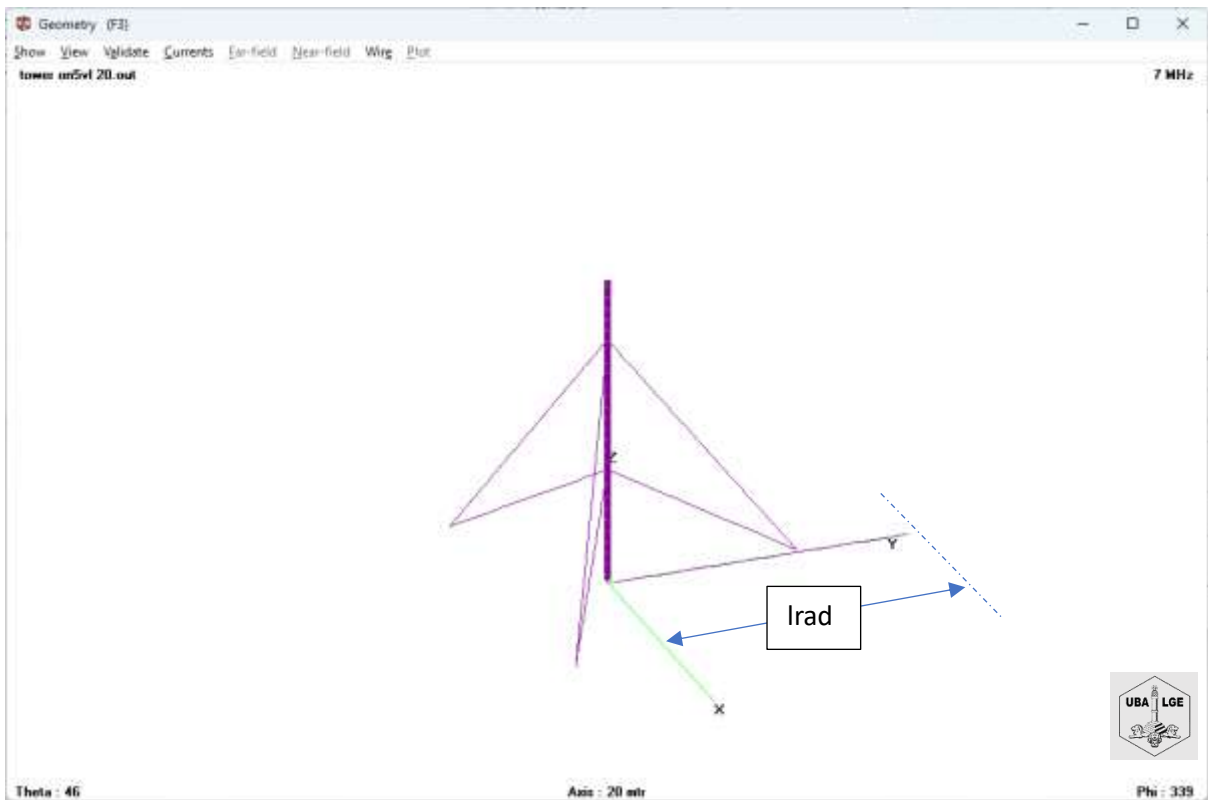


Fig 10: construction fil radial #1 – plan de terre

source: KJ4EGU

SY f=7		'f (MHz)
SY wl=300/f		'Wavelength (m)
SY a=33cm		'tower side
SY b=a/2/sqr(3)		'Y axis direction spacing
SY c=55cm		'tower module height
SY rad1=12mm		'tower metallic element radius
SY h=45		'total height tower
SY n=int(h/c)		'module number
SY s=40cm		'concrete base height
SY lh=13.5		'guy wire distance from tower (m)
SY lrad=wl/2		'radial length (m)
SY nrad=18		'radials numbers

GW	1	1	-a/2	-b	0	-a/2	-b	c	rad1
GW	2	1	-a/2	-b	c	a/2	-b	c	rad1
GW	3	1	-a/2	-b	0	a/2	-b	c	rad1
GM	0	2	0	0	120	0	0	0	1
GM	0	n	0	0	0	0	0	c	1
GW	1000	10	0	lh	0	0	2*b	30*c	3mm
GW	1001	10	0	lh	0	0	2*b	65*c	3mm
GM	0	2	0	0	120	0	0	0	1000
GM	0	0	0	0	0	0	0	s	1
GW	1500	10	0	2*a	0	0	lrad	0	1mm
GM	0	nrad-1	0	0	360/nrad	0	0	0	1500
GA	2000	nrad	2.a	0	360	1mm			
GM	0	0	90	0	0	0	0	0	2000

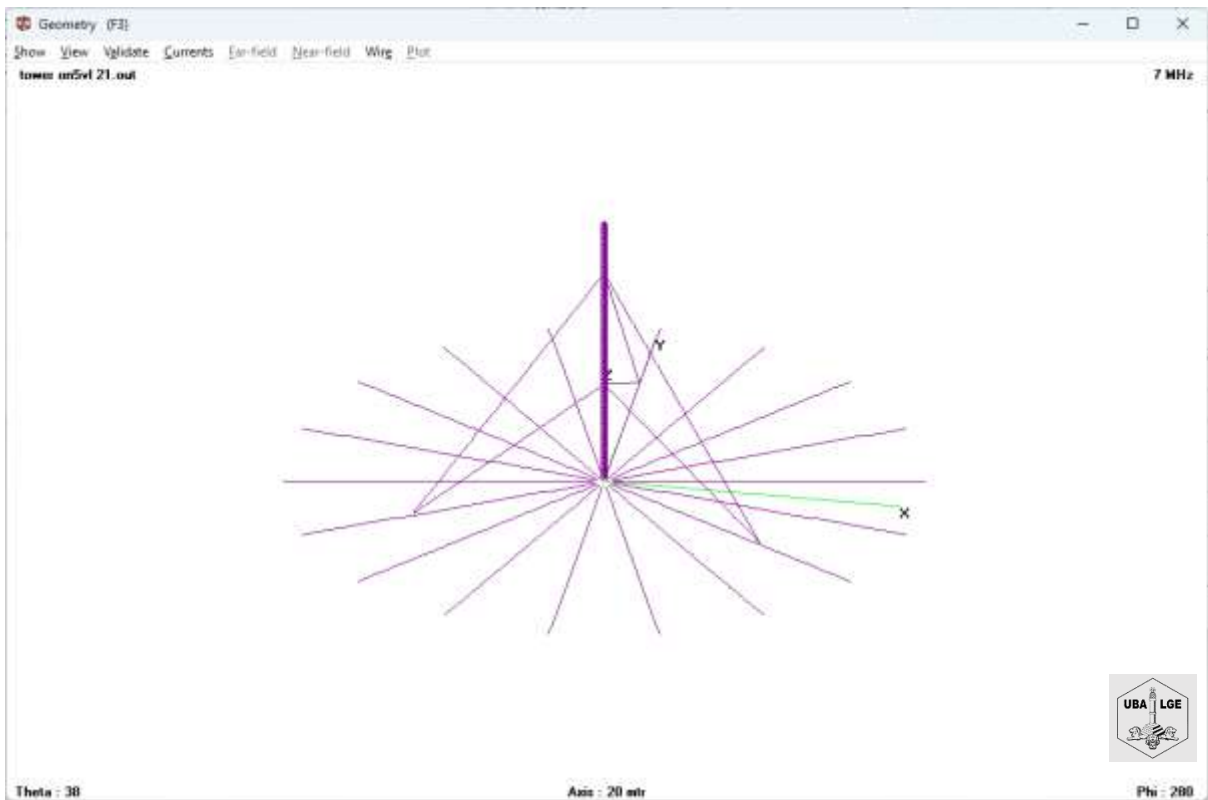


Fig 11: construction plan de terre- fils radiaux

source: KJ4EGU

SY f=7			'f (MHz)						
SY wl=300/f			'Wavelength (m)						
SY a=33cm			'tower side						
SY b=a/2/sqr(3)			'Y axis direction spacing						
SY c=55cm			'tower module height						
SY rad1=12mm			'tower metallic element radius						
SY h=45			'total height tower						
SY n=int(h/c)			'module number						
SY s=40cm			'concrete base height						
SY lh=13.5			'guy wire distance from tower (m)						
SY lrad=wl/2			'radial length (m)						
SY nrad=18			'radials numbers						
GW 1	1	1	-a/2	-b	0	-a/2	-b	c	rad1
GW 2	1	1	-a/2	-b	c	a/2	-b	c	rad1
GW 3	1	1	-a/2	-b	0	a/2	-b	c	rad1
GM 0	2	2	0	0	120	0	0	0	1
GM 0	n	n	0	0	0	0	0	c	1
GW 1000	10	10	0	lh	0	0	2*b	30*c	3mm
GW 1001	10	10	0	lh	0	0	2*b	65*c	3mm
GM 0	2	2	0	0	120	0	0	0	1000
GM 0	0	0	0	0	0	0	0	s	1
GW 1500	10	10	0	2*a	0	0	lrad	0	1mm
GM 0	nrad-1	0	0	0	360/nrad	0	0	0	1500
GA	2000	nrad	2.a	0	360	1mm			
GM 0	0	0	90	0	0	0	0	0	2000

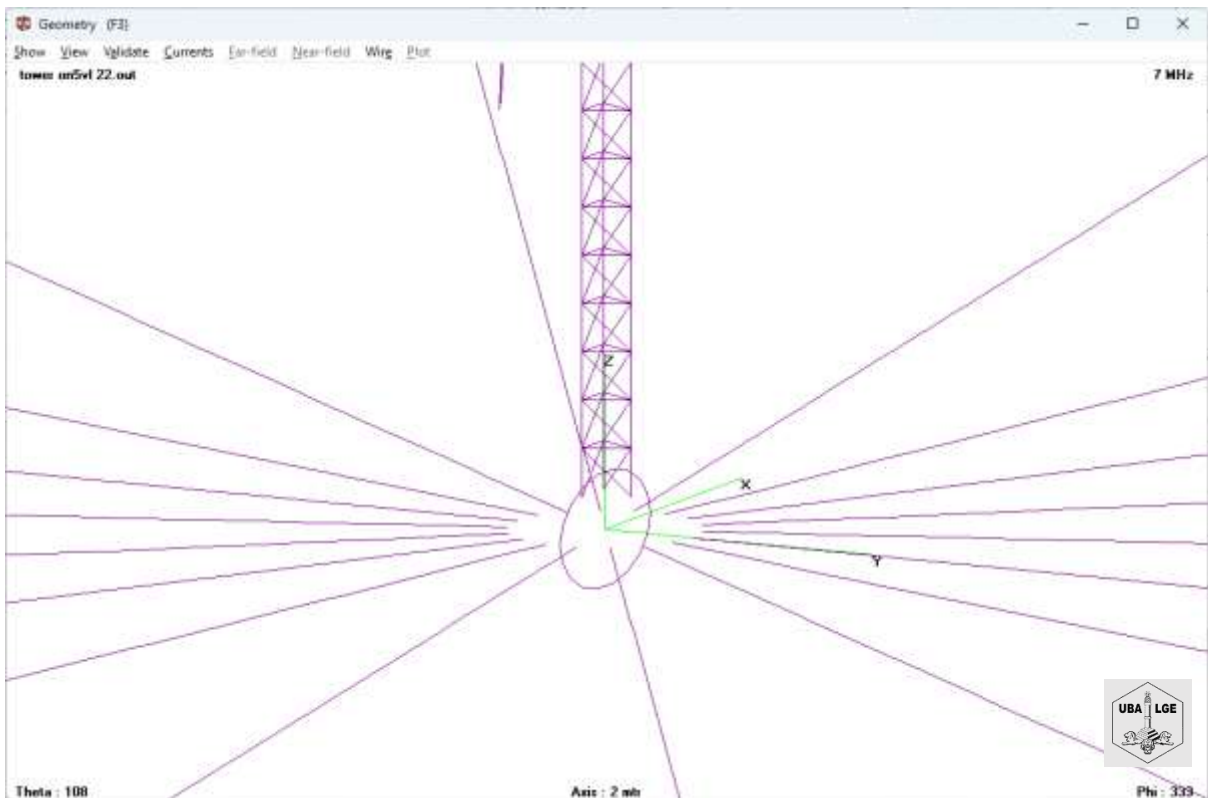


Fig 12: connexion plan de terre – position verticale

source: KJ4EGU

SY f=7		'f (MHz)								
SY wl=300/f		'Wavelength (m)								
SY a=33cm		'tower side								
SY b=a/2/sqr(3)		'Y axis direction spacing								
SY c=55cm		'tower module height								
SY rad1=12mm		'tower metallic element radius								
SY h=45		'total height tower								
SY n=int(h/c)		'module number								
SY s=40cm		'concrete base height								
SY lh=13.5		'guy wire distance from tower (m)								
SY lrad=wl/2		'radial length (m)								
SY nrad=18		'radials numbers								
GW 1	1	1	-a/2	-b	0	-a/2	-b	c	rad1	
GW 2	1	1	-a/2	-b	c	a/2	-b	c	rad1	
GW 3	1	1	-a/2	-b	0	a/2	-b	c	rad1	
GM 0	2	1	0	0	120	0	0	0	1	
GM 0	n	1	0	0	0	0	0	c	1	
GW 1000	10	1	0	lh	0	0	2*b	30*c	3mm	
GW 1001	10	1	0	lh	0	0	2*b	65*c	3mm	
GM 0	2	1	0	0	120	0	0	0	1000	
GM 0	0	1	0	0	0	0	0	s	1	
GW 1500	10	1	0	2*a	0	0	lrad	0	1mm	
GM 0	nrad-1	1	0	0	360/nrad	0	0	0	0	1500
GA 2000	nrad	1	2.a	0	360	1mm				
GM 0	0	1	90	0	0	0	0	0	2000	

**CONFIDENTIAL**

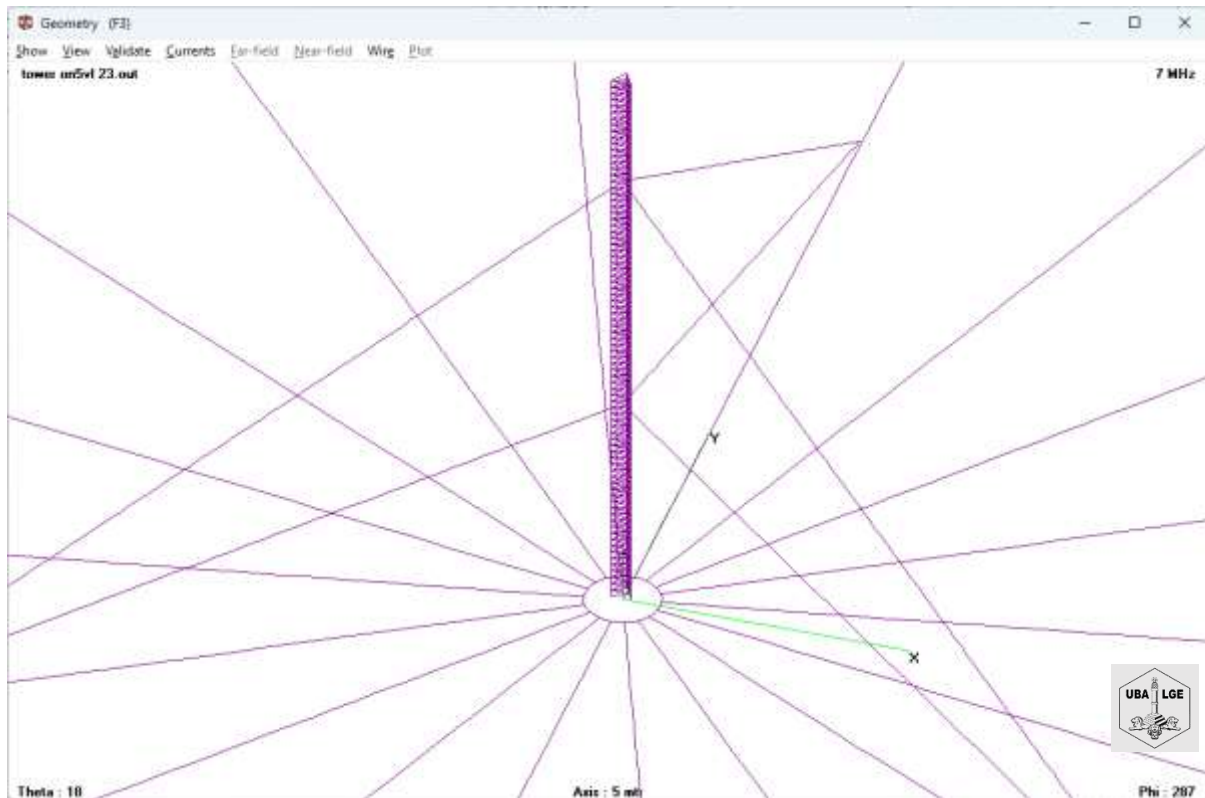


Fig 13: connexion plan de terre finale – position horizontale

source: KJ4EGU

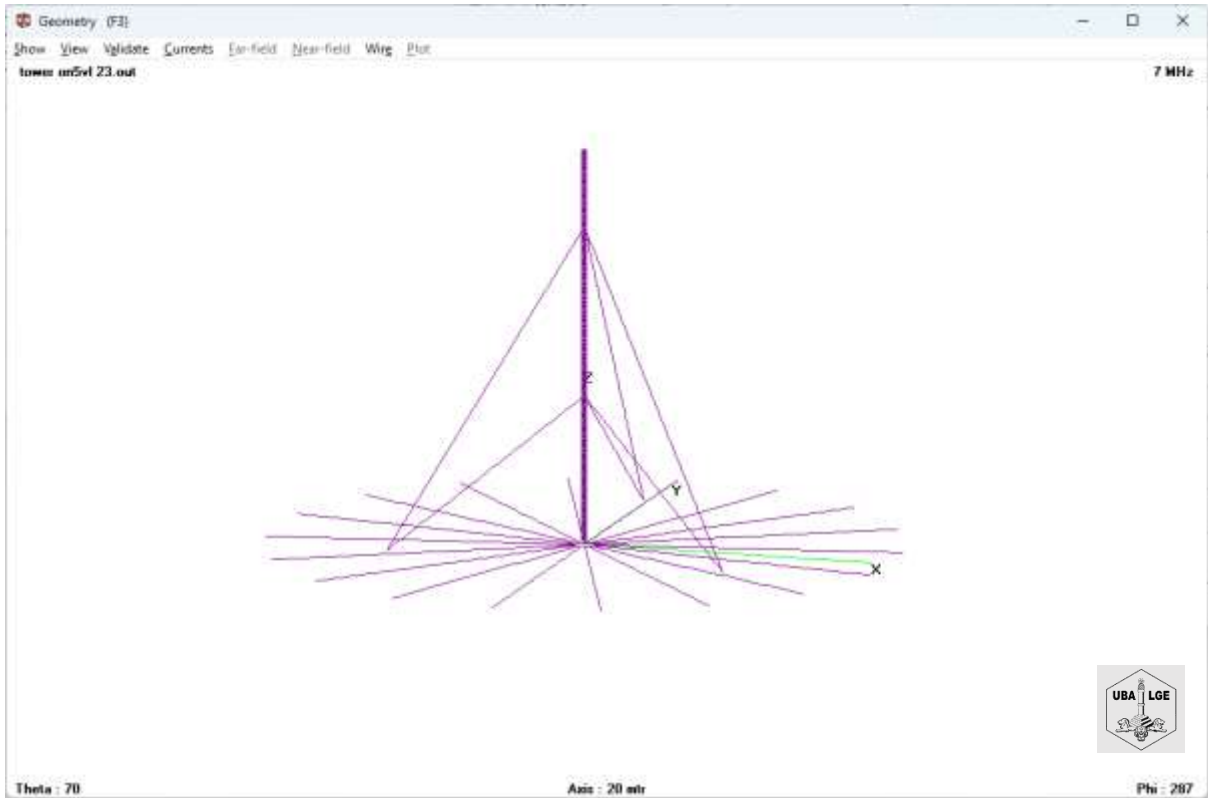


Fig 14a: pylone + haubans + plan de terre

source: KJ4EGU

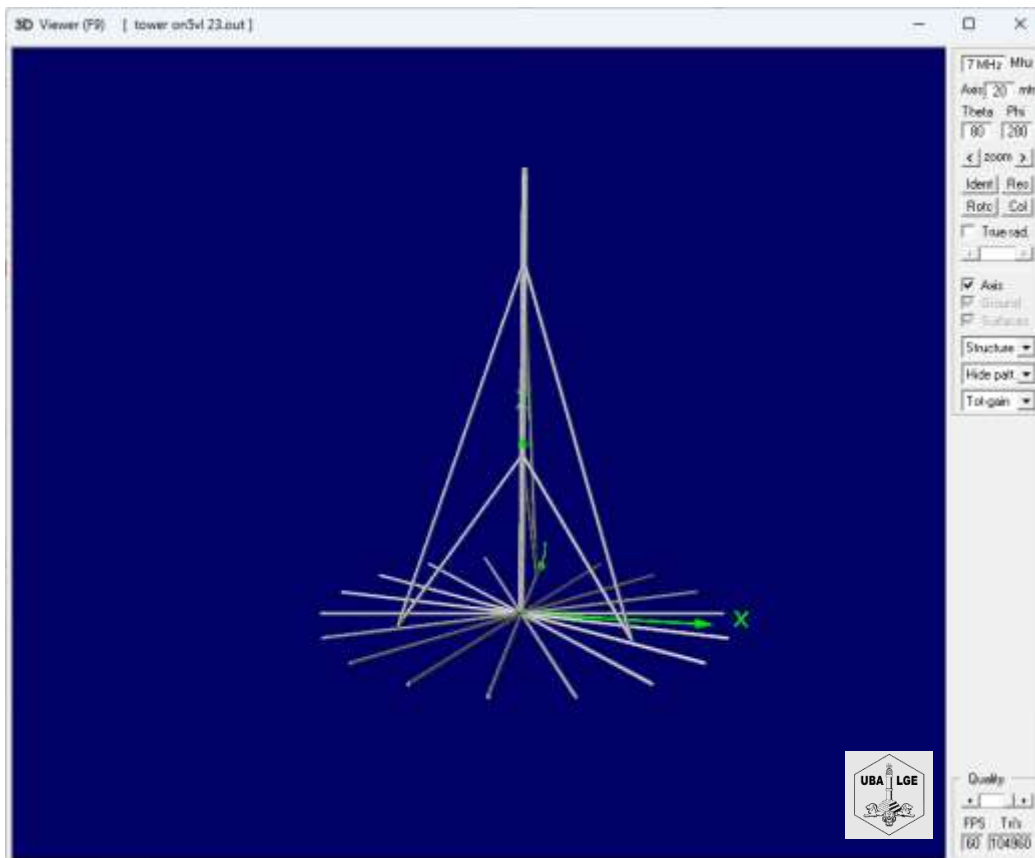


Fig 14b: pylone + haubans + terre

source: KJ4EGU





Fig 14c: pylone + haubans + terre

source: KJ4EGU

