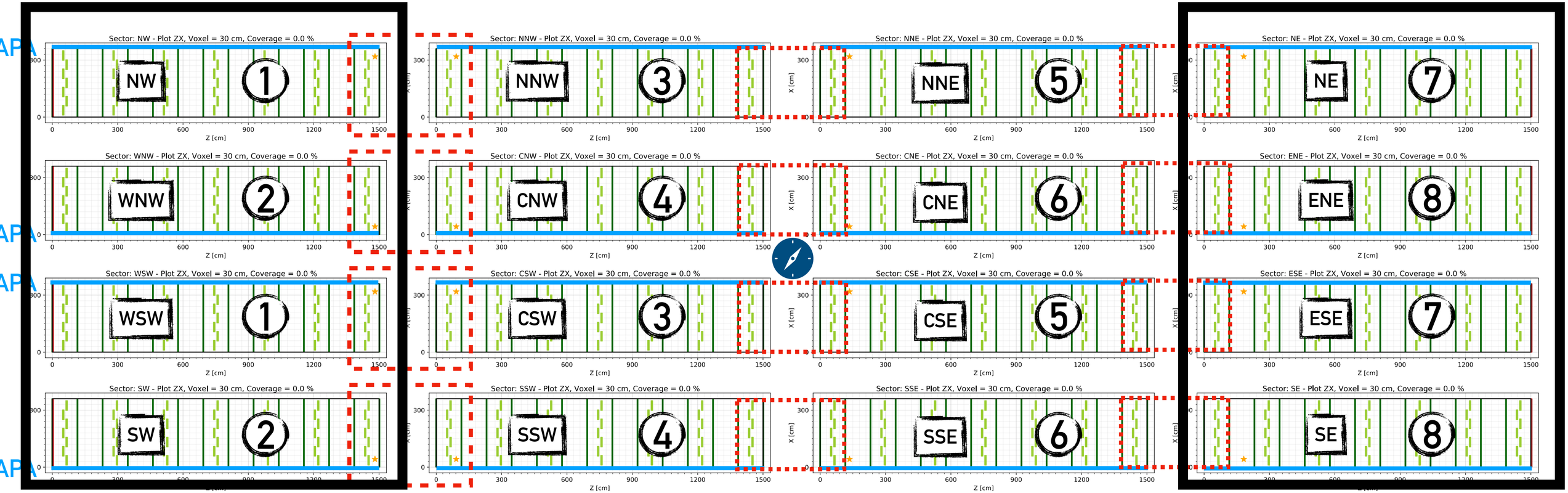
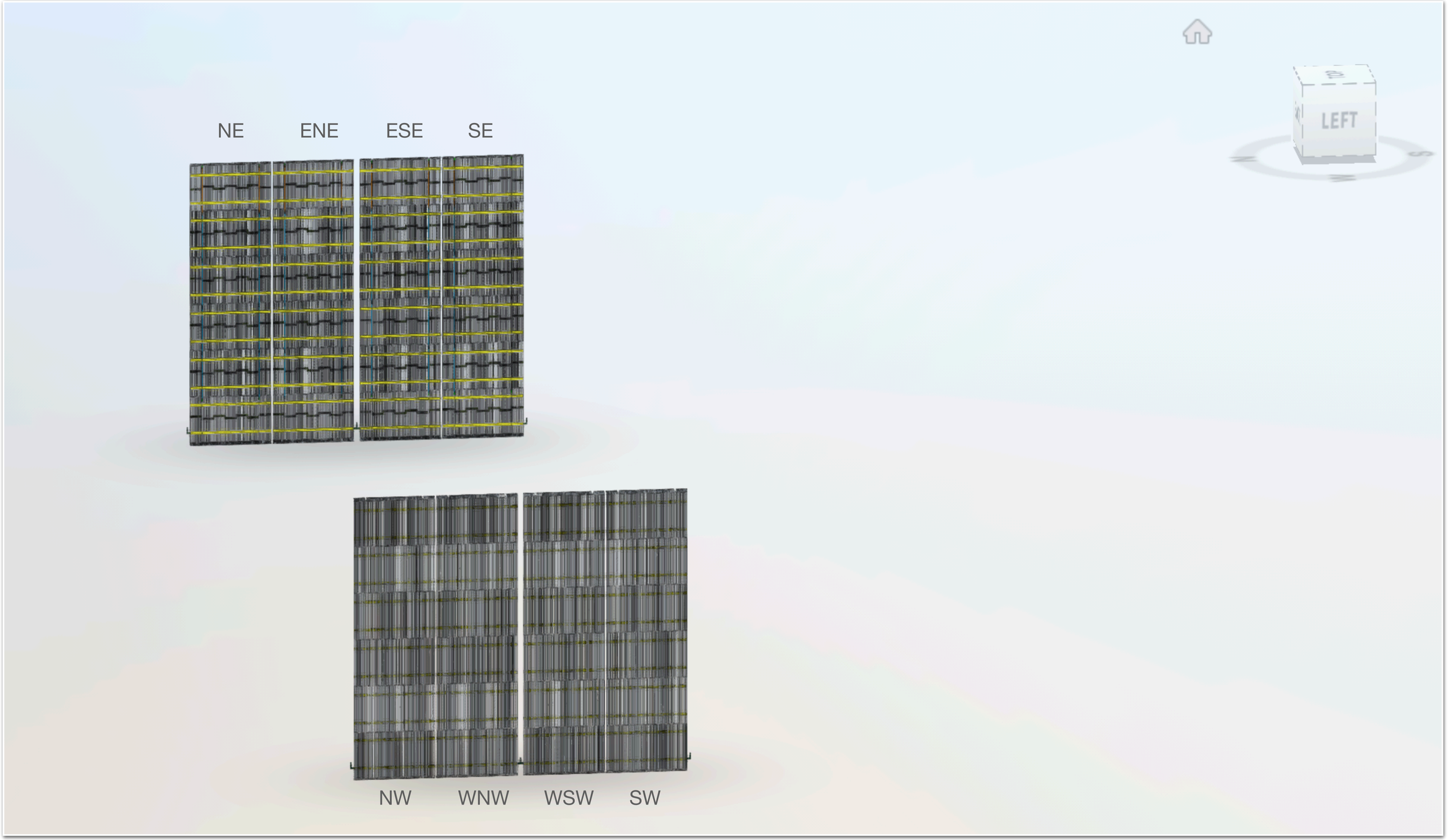
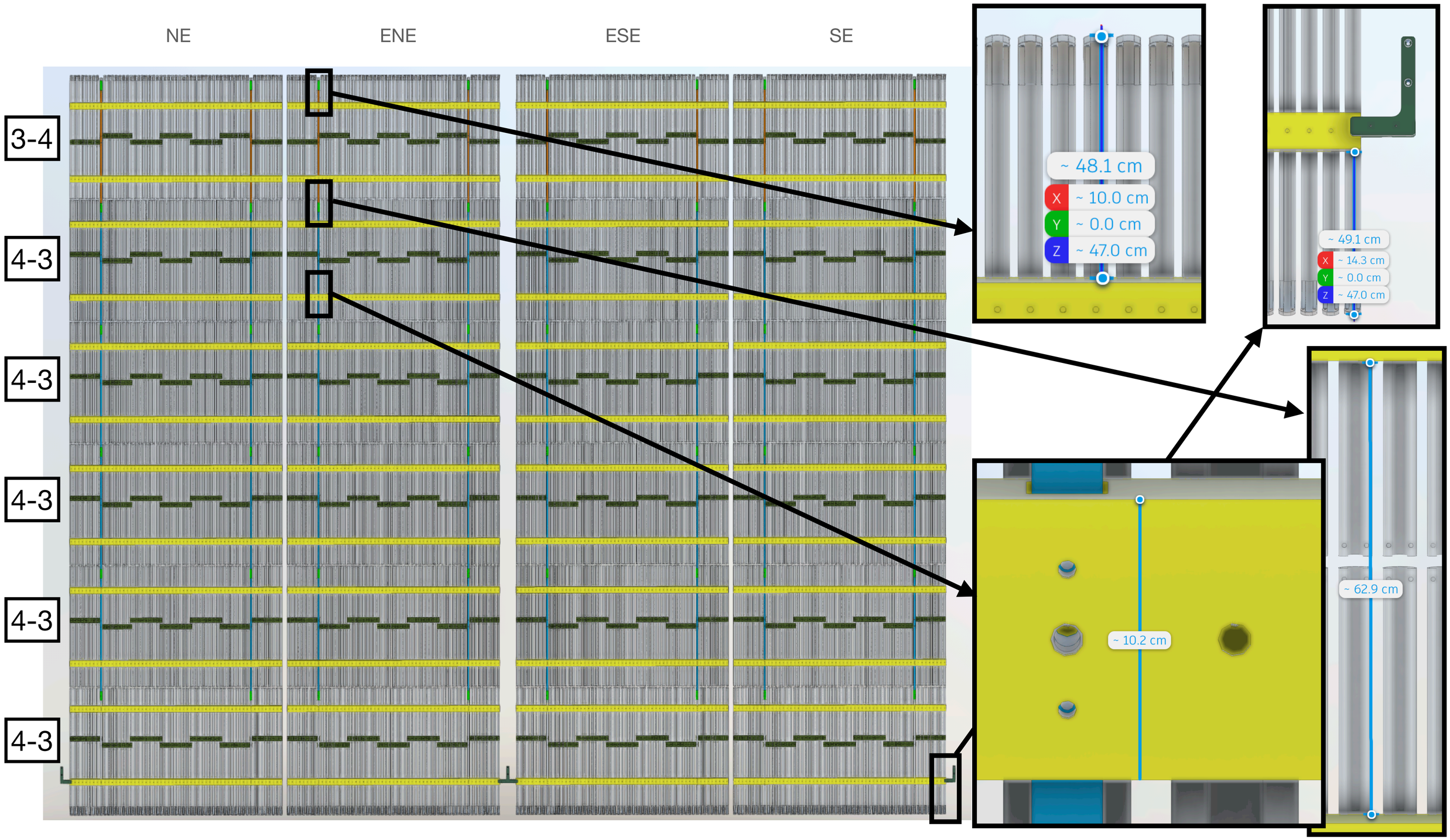
End-wall study

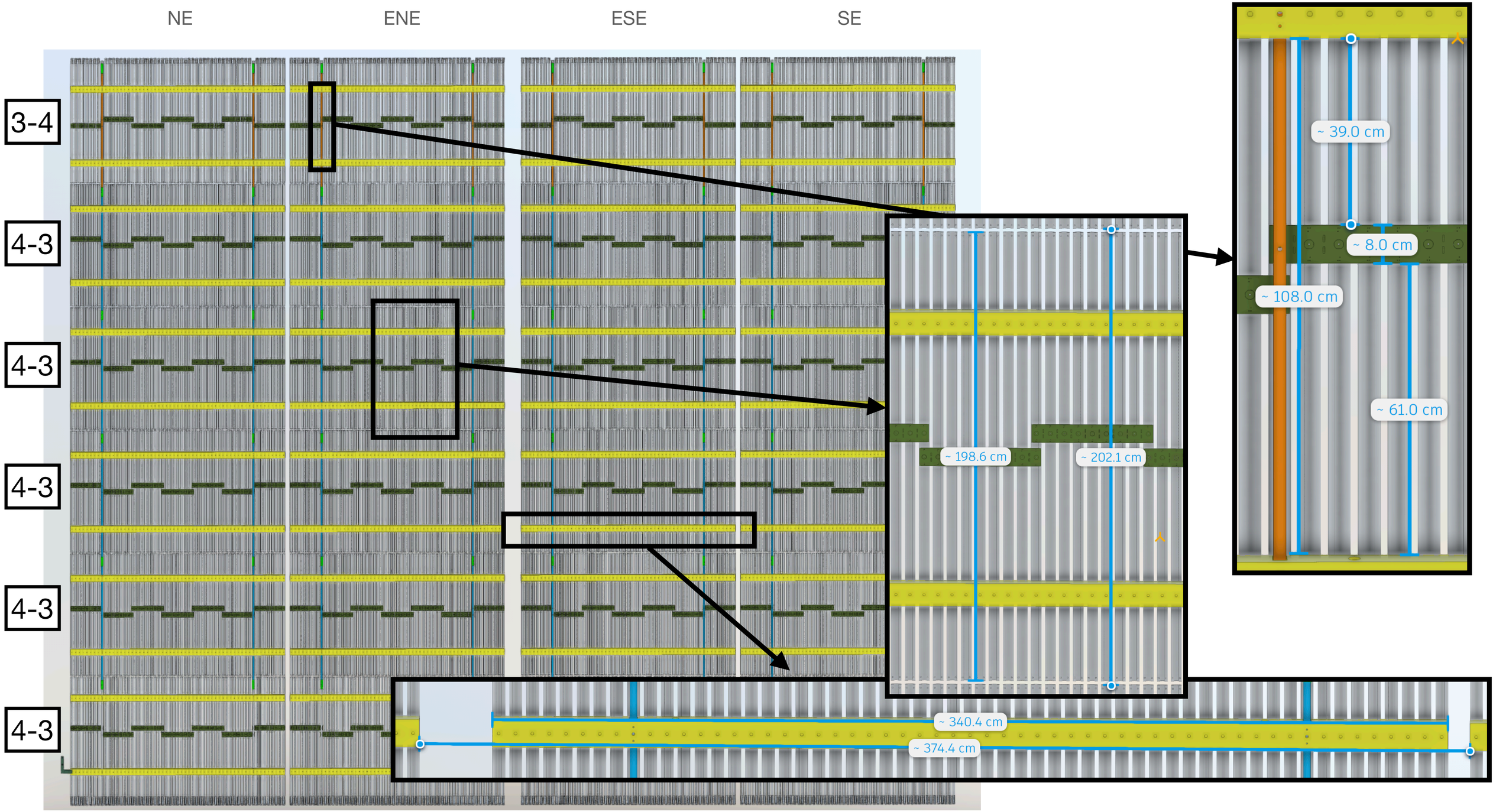
Mattia - Mar 17, 2020

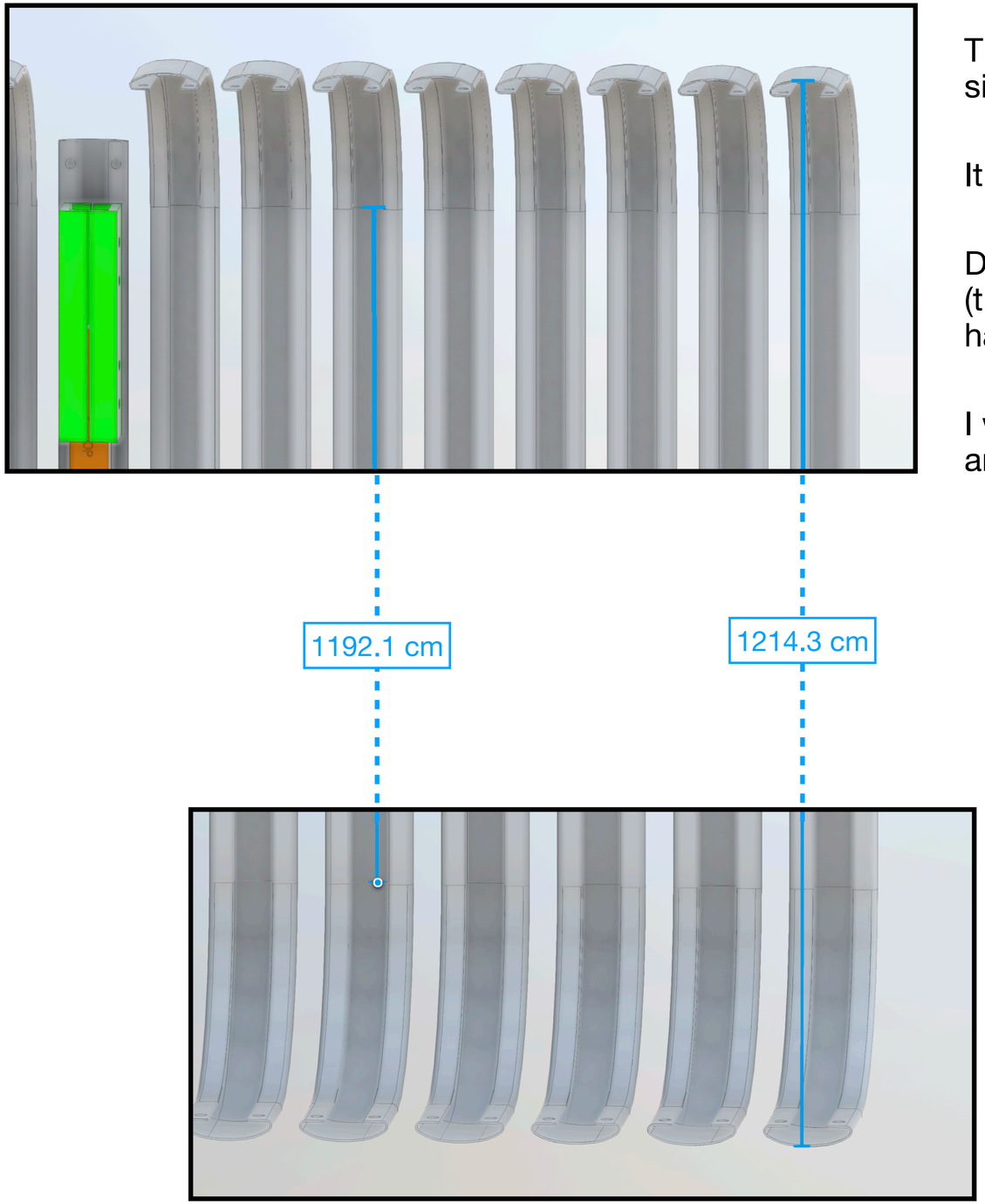
We only consider the end-wall periscopes shining light into the end-wall sectors




NE
ENE
ESE
SE
NW
WNW
WSW
SW
LEFT


NE
ENE
ESE
SE
3-4
4-3
4-3
4-3
4-3
4-3
~ 48.1 cm
X ~ 10.0 cm
Y ~ 0.0 cm
Z ~ 47.0 cm
~ 49.1 cm
X ~ 14.3 cm
Y ~ 0.0 cm
Z ~ 47.0 cm
~ 10.2 cm
~ 62.9 cm


NE
ENE
ESE
SE
3-4
4-3
4-3
4-3
4-3
4-3
~ 198.6 cm
~ 202.1 cm
~ 39.0 cm
~ 8.0 cm
~ 108.0 cm
~ 61.0 cm
~ 340.4 cm
~ 374.4 cm

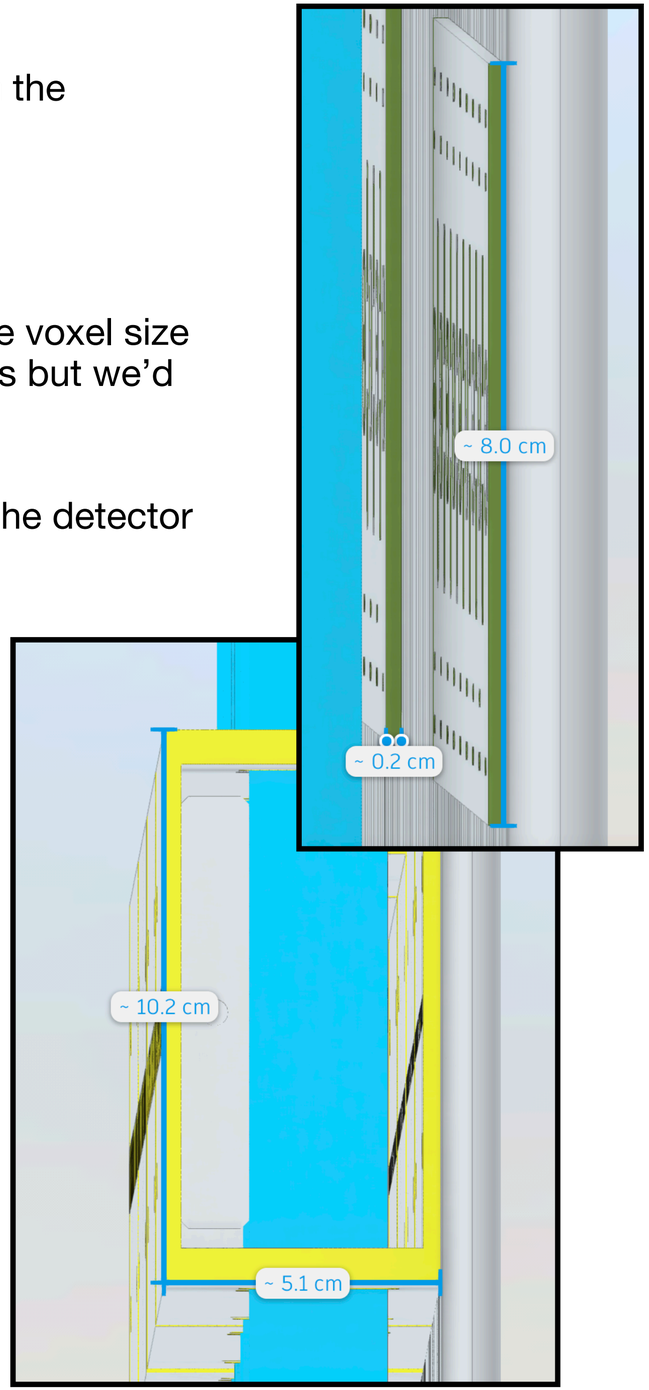


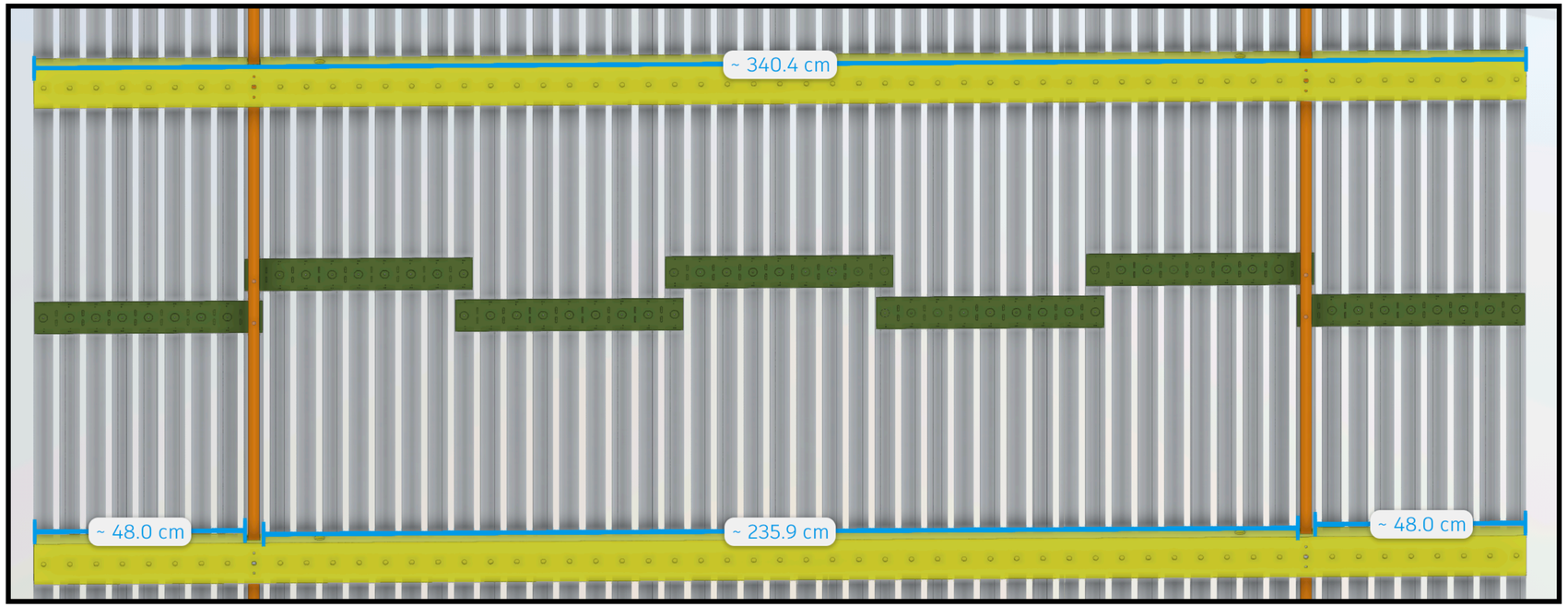
The detector is 14 cm taller than the model in the simulation.

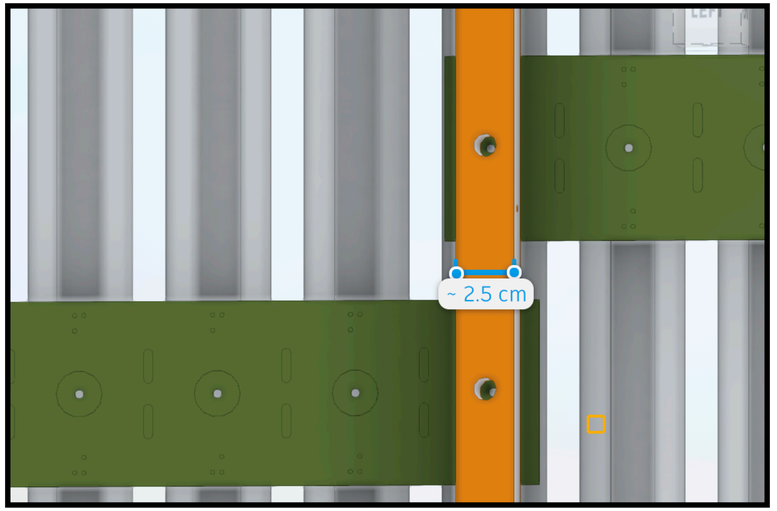
It's 7 cm per side (top/bottom)

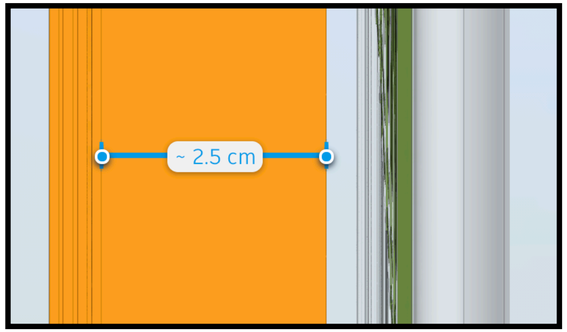
Detector dimensions should be multiple of the voxel size (the calculation would go on without problems but we'd have non-entire voxels counted as entire)

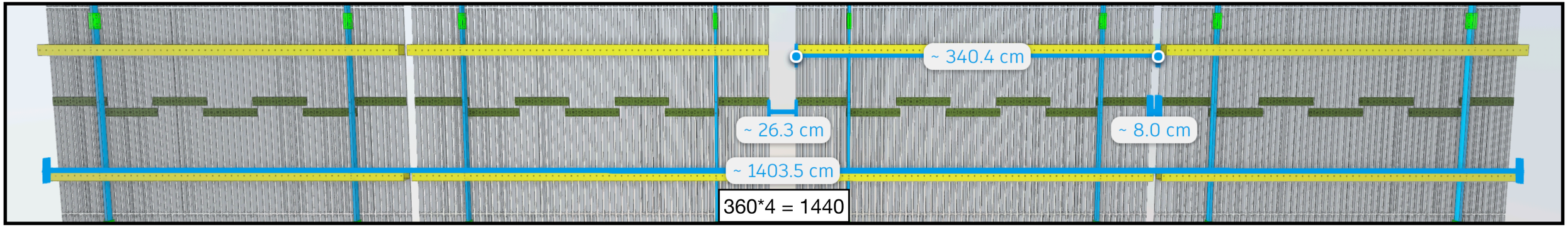
I will reproduce the dimensions at the top of the detector and apply a negative offset at y = 0

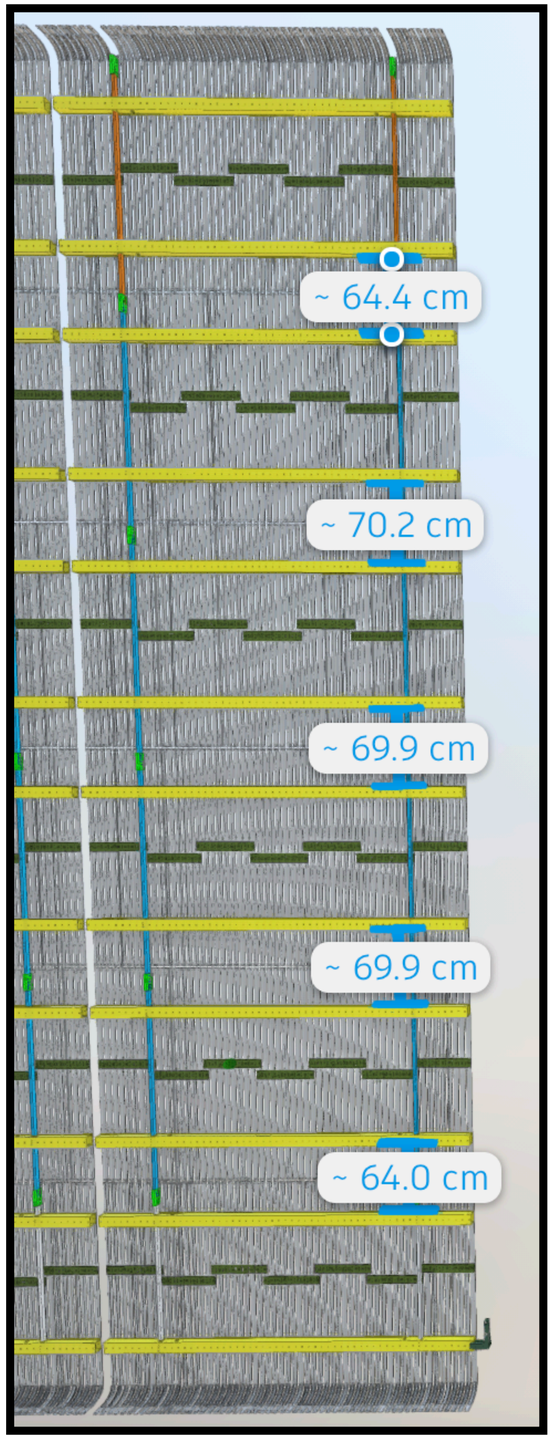


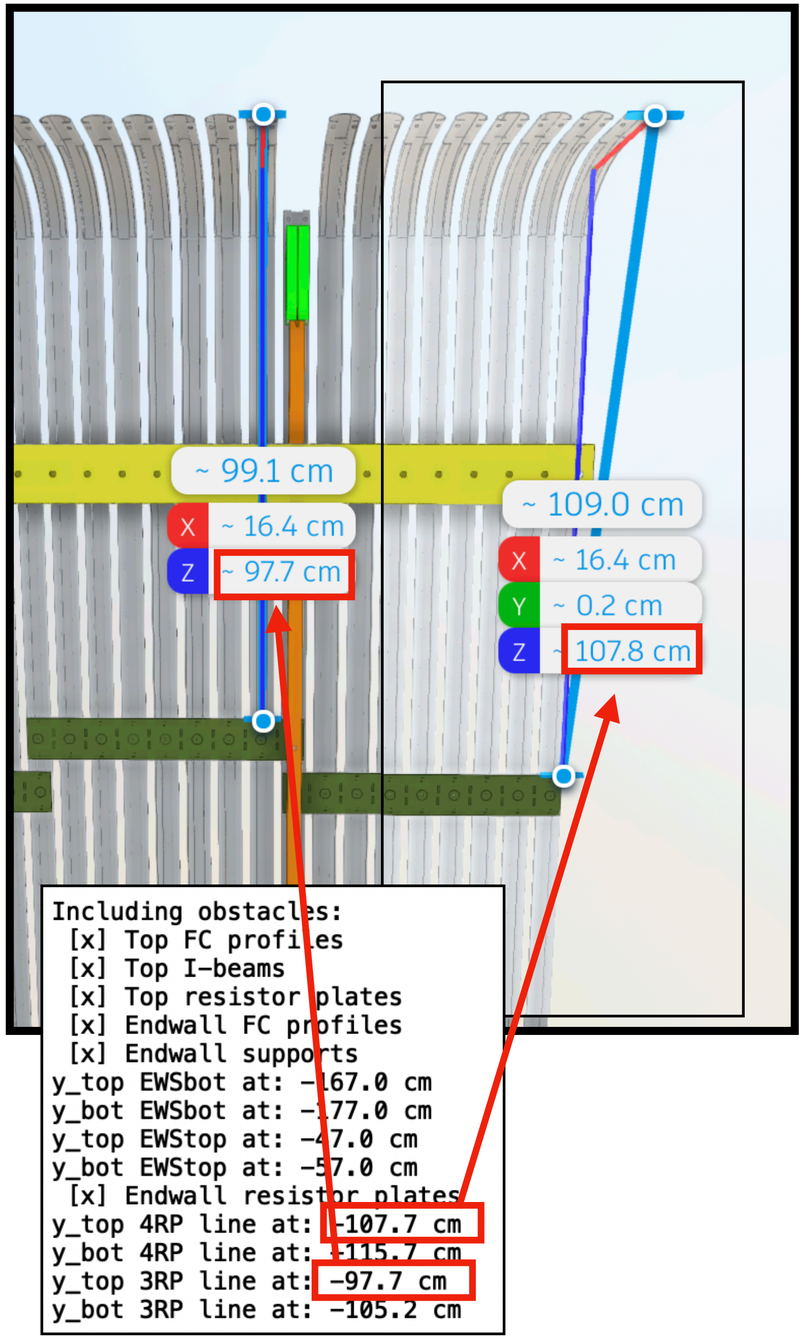

~ 340.4 cm
~ 48.0 cm
~ 235.9 cm
~ 48.0 cm

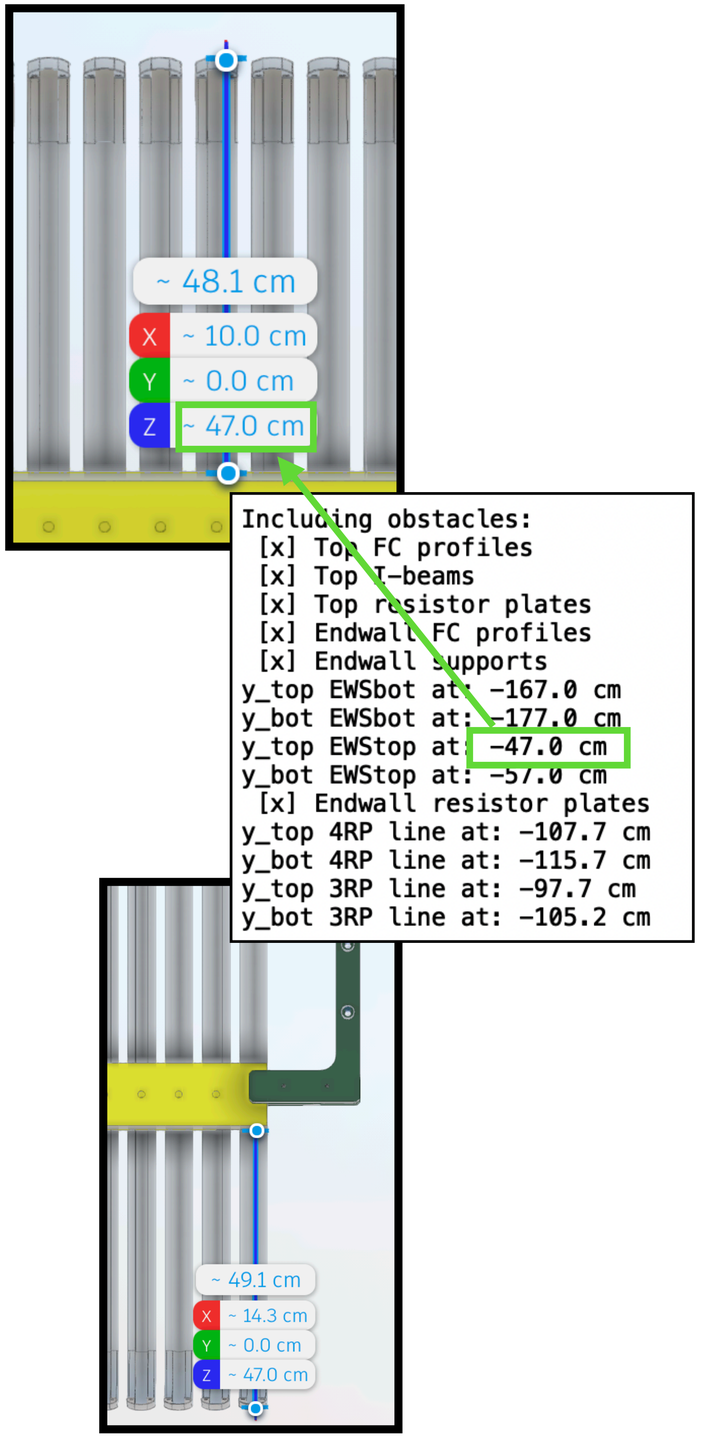

~ 2.5 cm

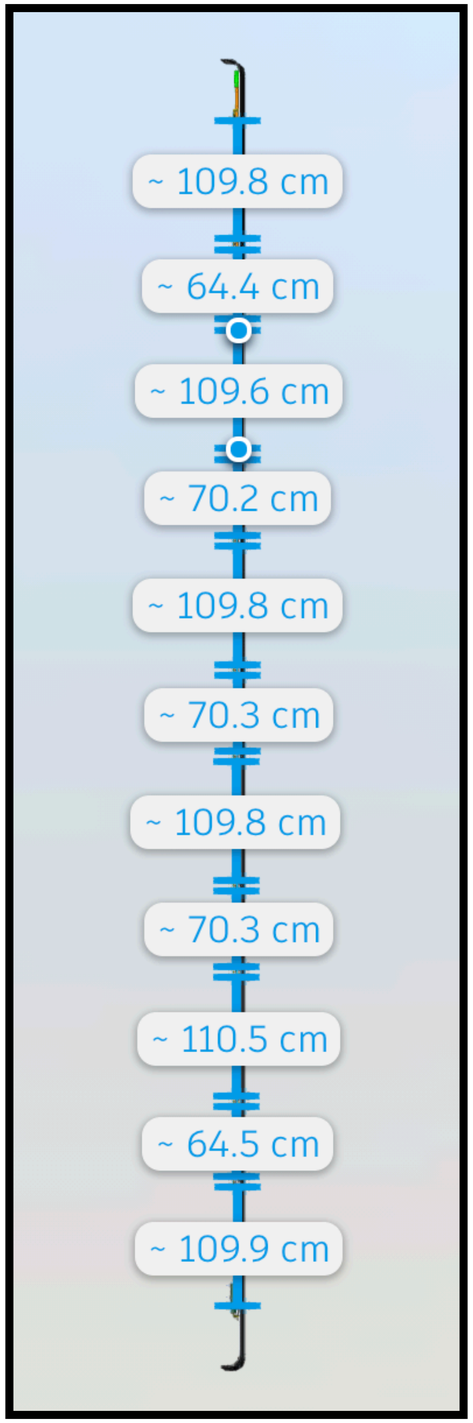

~ 2.5 cm

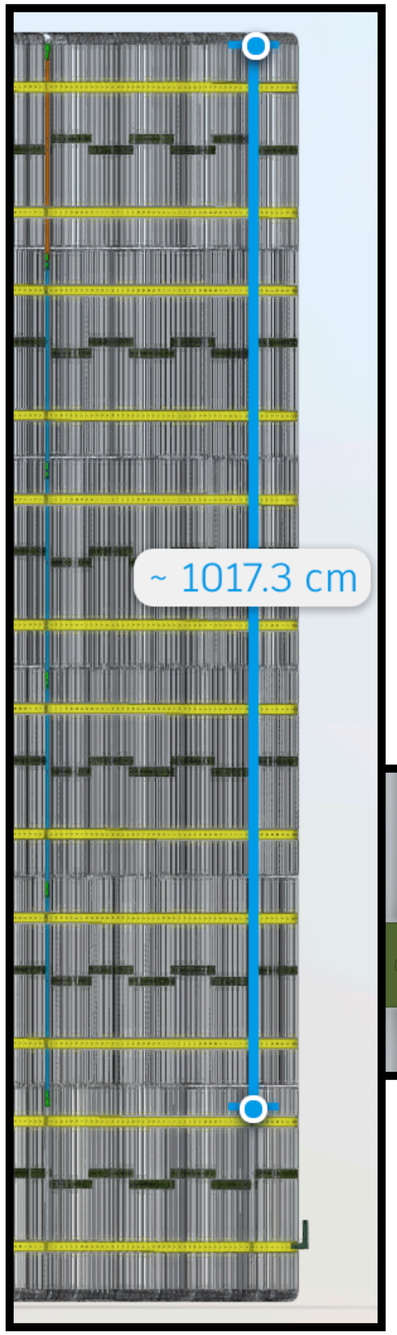

~ 340.4 cm
~ 26.3 cm
~ 8.0 cm
~ 1403.5 cm
360*4 = 1440

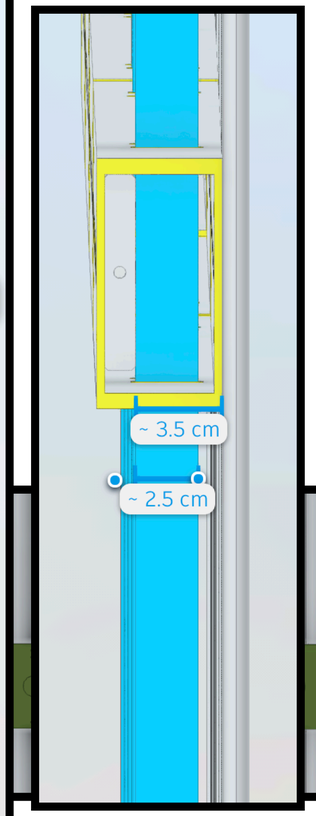

~ 64.4 cm
~ 70.2 cm
~ 69.9 cm
~ 69.9 cm
~ 64.0 cm

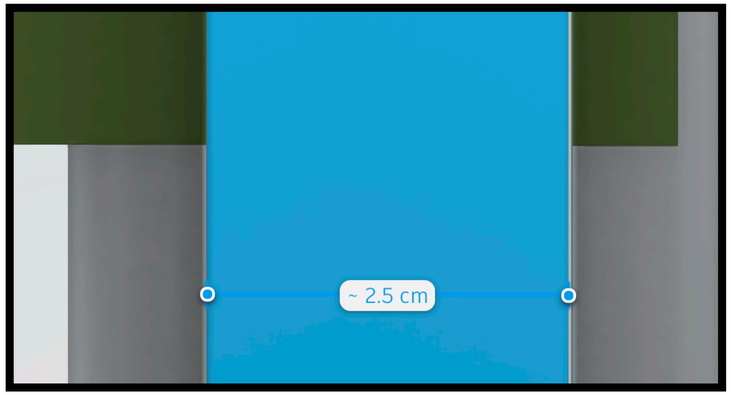

~ 99.1 cm
X ~ 16.4 cm
Z ~ 97.7 cm
~ 109.0 cm
X ~ 16.4 cm
Y ~ 0.2 cm
Z ~ 107.8 cm
Including obstacles:
[x] Top FC profiles
[x] Top I-beams
[x] Top resistor plates
[x] Endwall FC profiles
[x] Endwall supports
y_top EWSbot at: -167.0 cm
y_bot EWSbot at: -177.0 cm
y_top EWStop at: -47.0 cm
y_bot EWStop at: -57.0 cm
[x] Endwall resistor plates
y_top 4RP line at: -107.7 cm
y_bot 4RP line at: -115.7 cm
y_top 3RP line at: -97.7 cm
y_bot 3RP line at: -105.2 cm

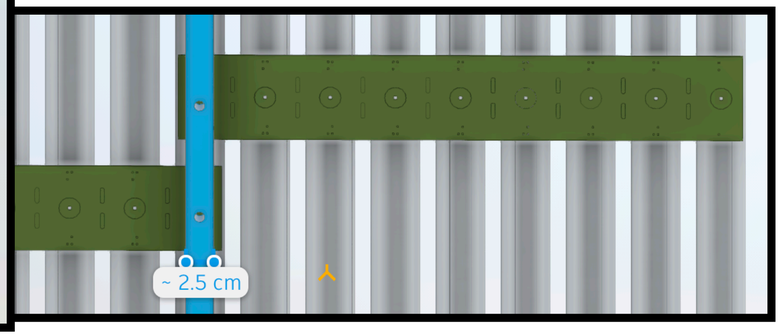

~ 48.1 cm
X ~ 10.0 cm
Y ~ 0.0 cm
Z ~ 47.0 cm
Including obstacles:
[x] Top FC profiles
[x] Top I-beams
[x] Top resistor plates
[x] Endwall FC profiles
[x] Endwall supports
y_top EWSbot at: -167.0 cm
y_bot EWSbot at: -177.0 cm
y_top EWStop at: -47.0 cm
y_bot EWStop at: -57.0 cm
[x] Endwall resistor plates
y_top 4RP line at: -107.7 cm
y_bot 4RP line at: -115.7 cm
y_top 3RP line at: -97.7 cm
y_bot 3RP line at: -105.2 cm
~ 49.1 cm
X ~ 14.3 cm
Y ~ 0.0 cm
Z ~ 47.0 cm

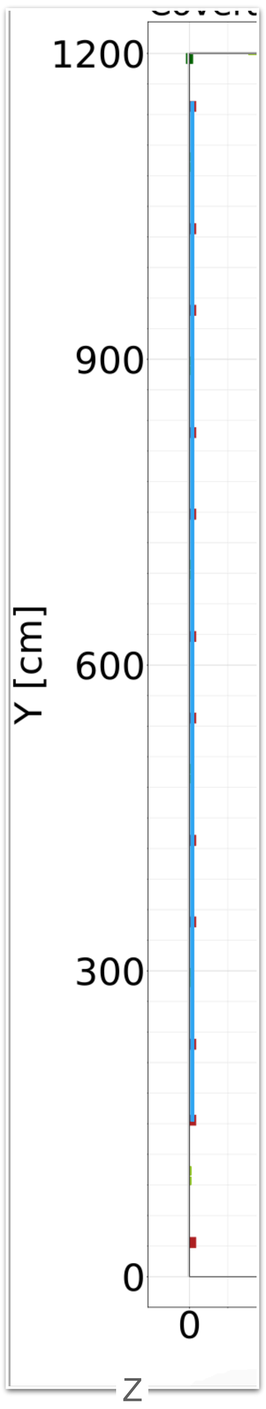

~ 109.8 cm
~ 64.4 cm
~ 109.6 cm
~ 70.2 cm
~ 109.8 cm
~ 70.3 cm
~ 109.8 cm
~ 70.3 cm
~ 110.5 cm
~ 64.5 cm
~ 109.9 cm

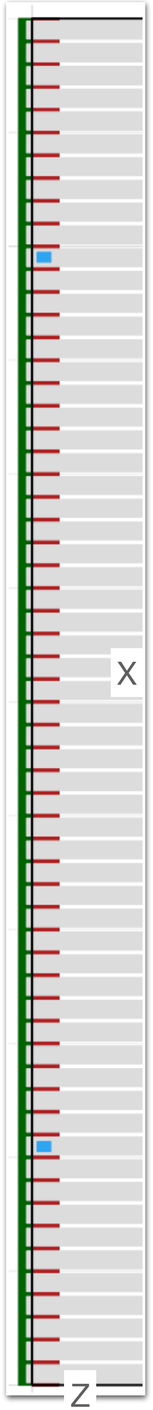

~ 1017.3 cm

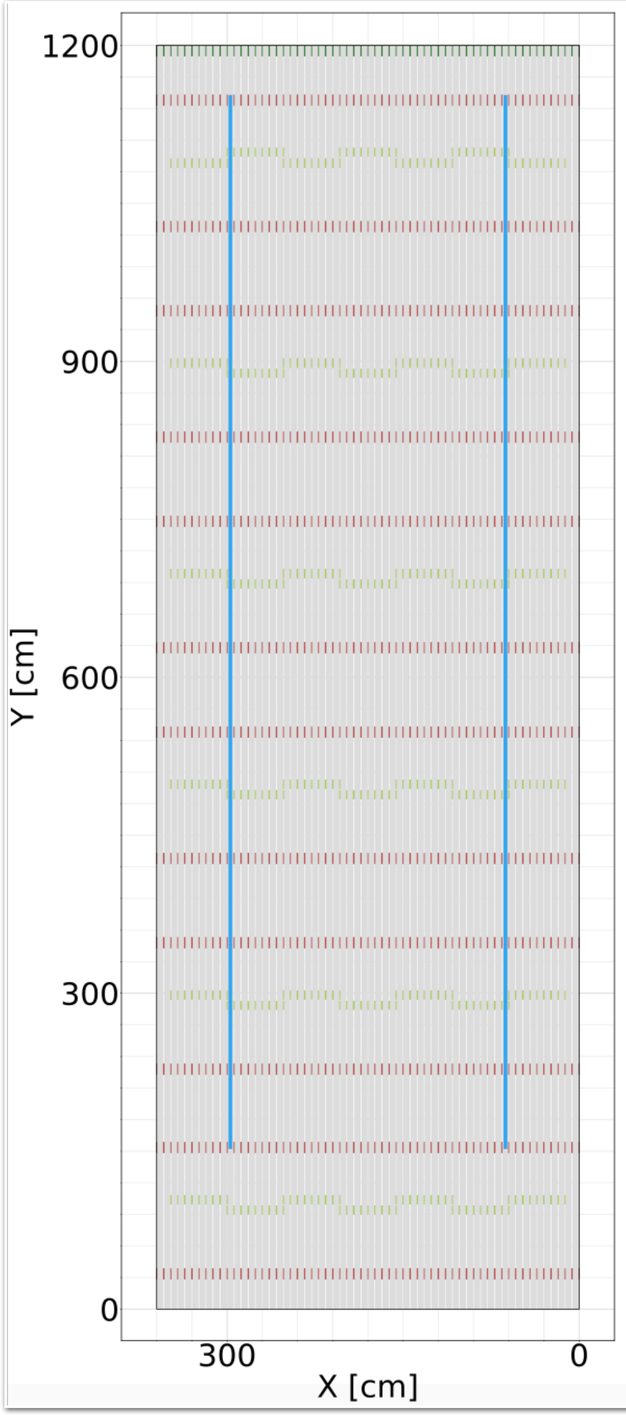

~ 3.5 cm
~ 2.5 cm

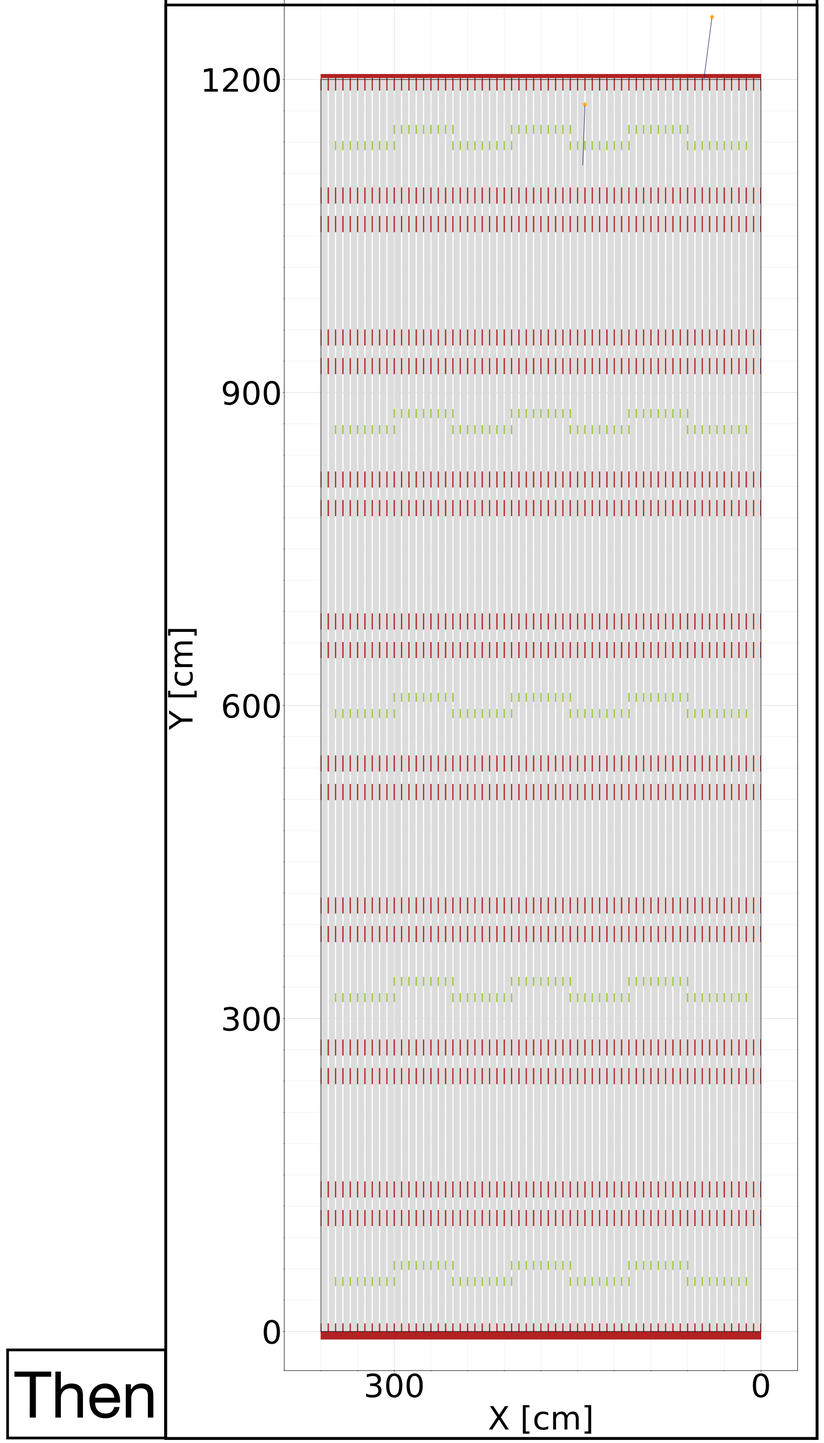

~ 2.5 cm

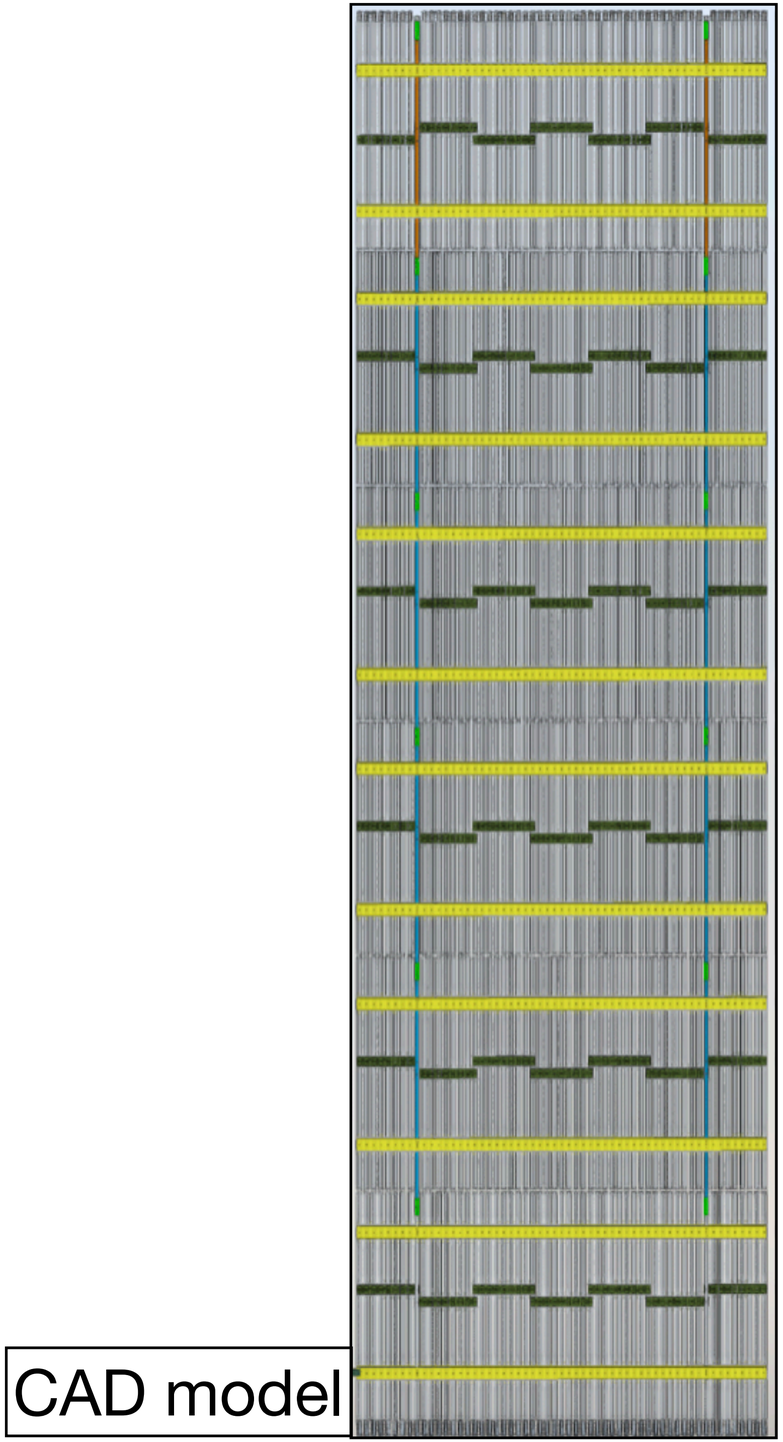

~ 2.5 cm

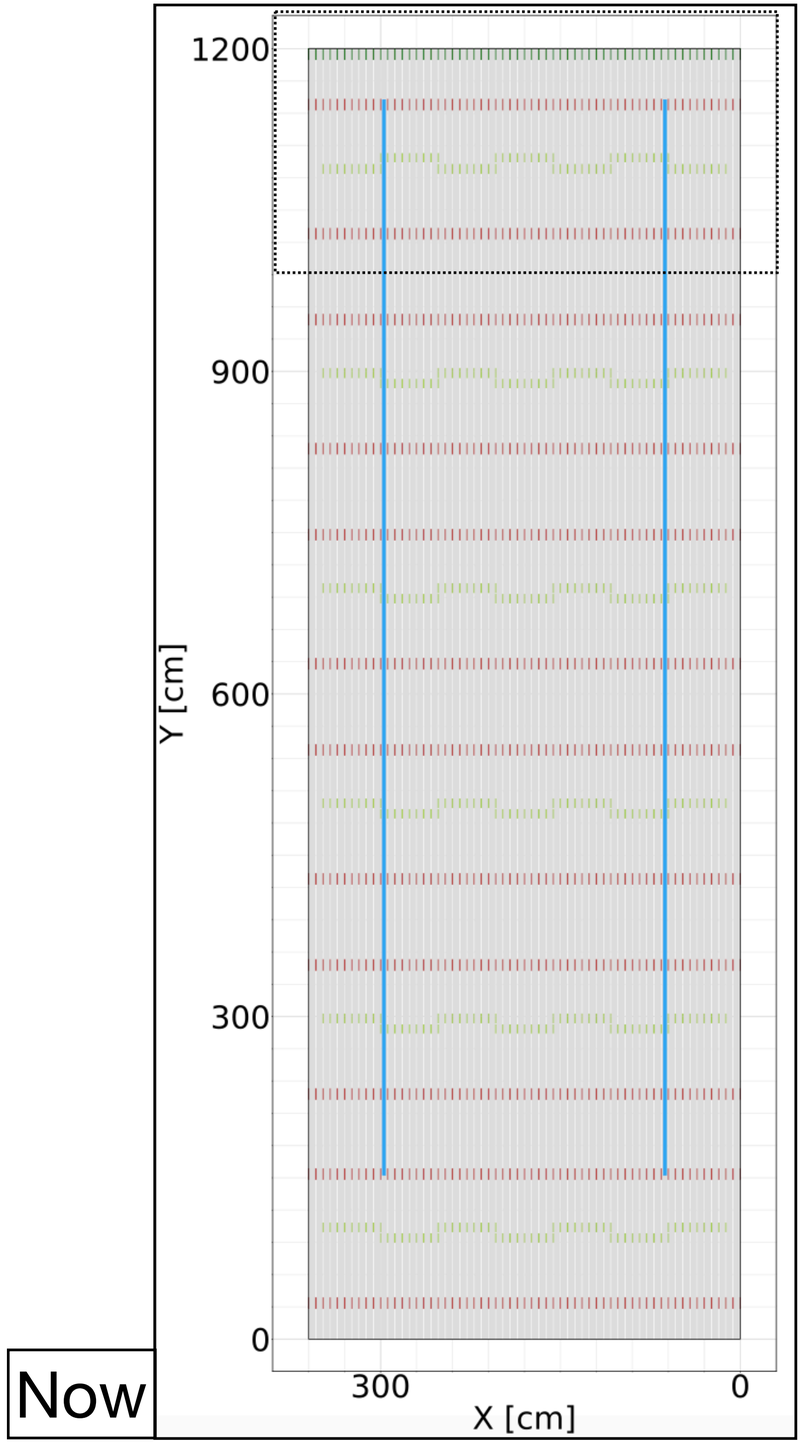

1200
900
600
300
0
Y [cm]
0
Z

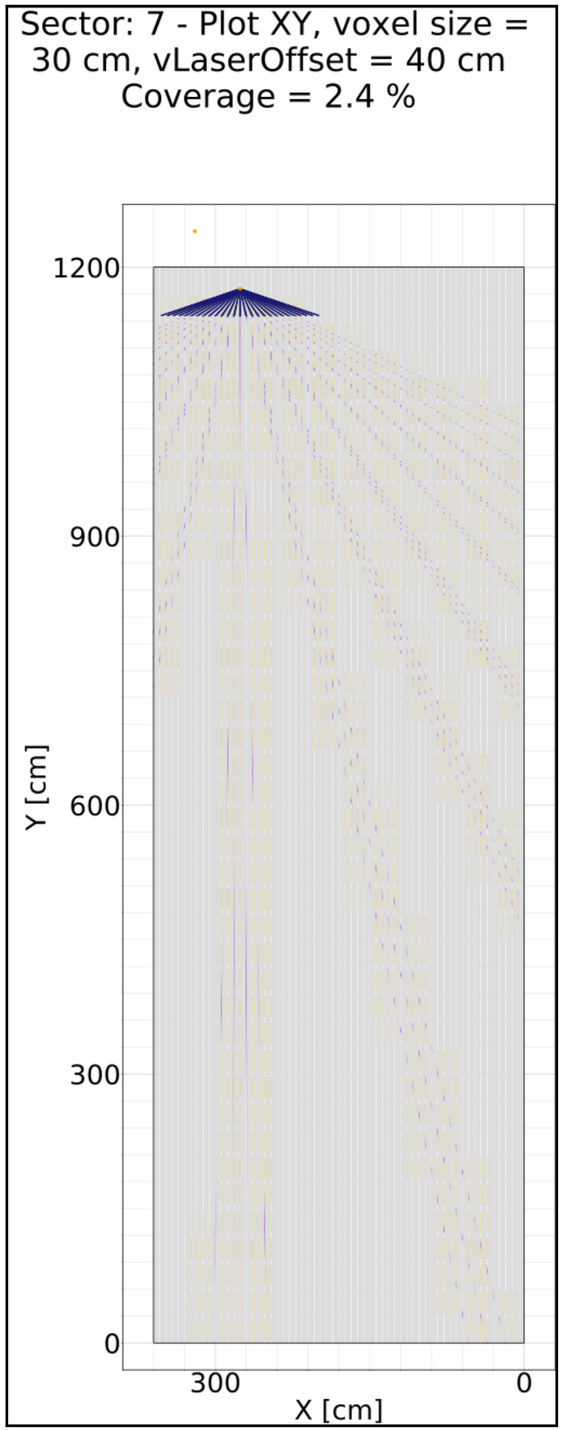

X
Z

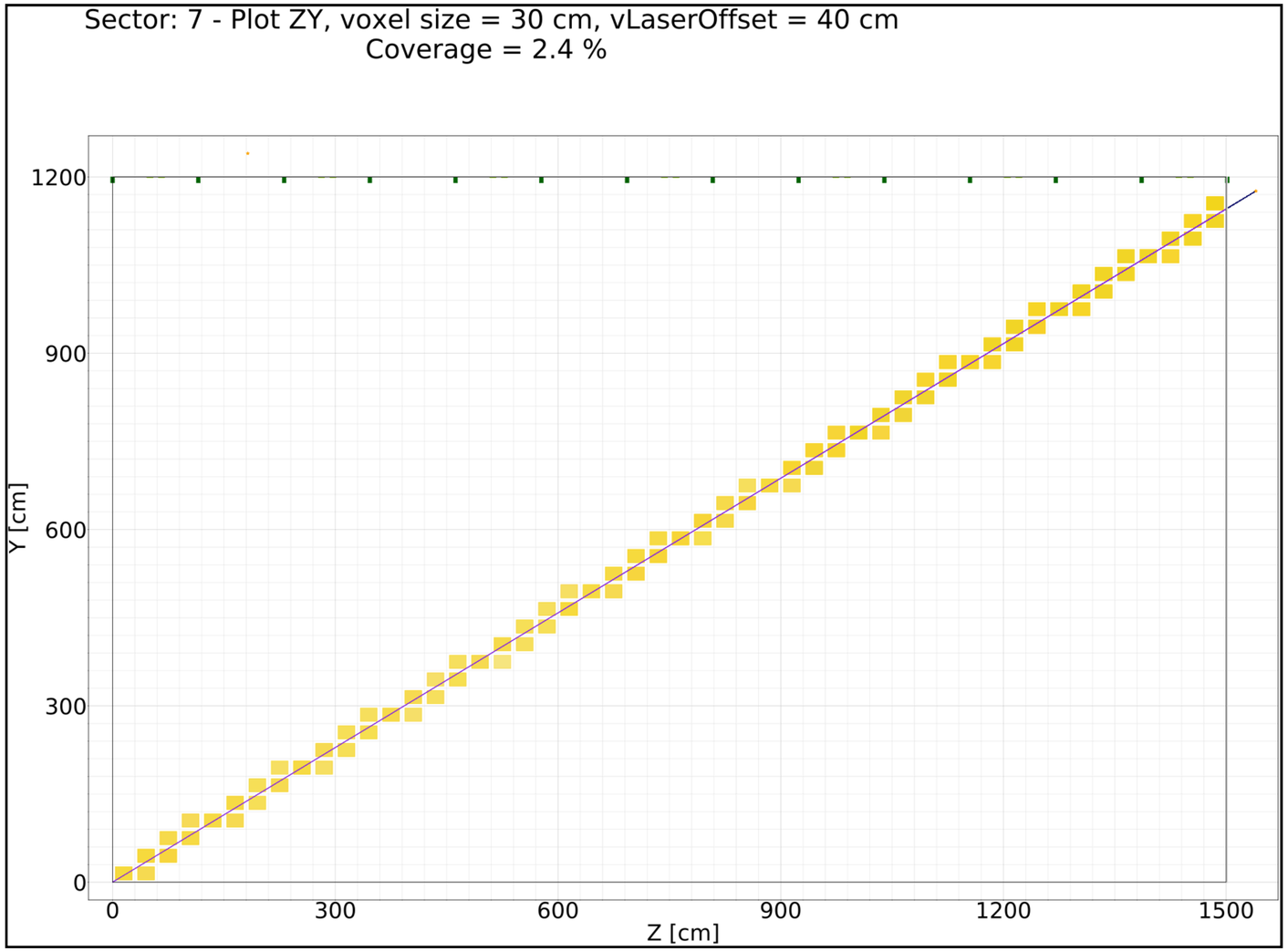

1200
900
600
300
0
Y [cm]
300
0
X [cm]

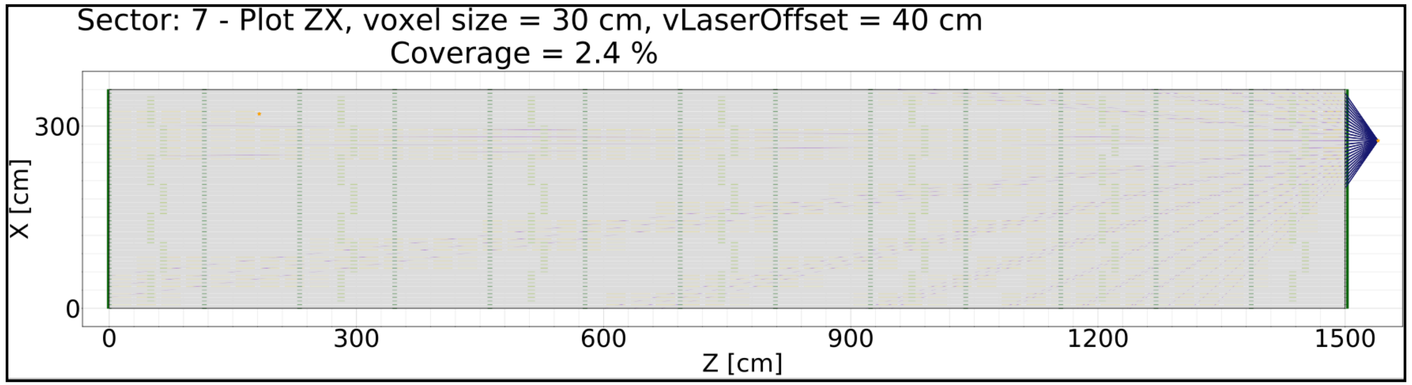

Then
1200
900
600
300
0
Y [cm]
300
0
X [cm]


CAD model


Now
1200
900
600
300
0
Y [cm]
300
0
X [cm]

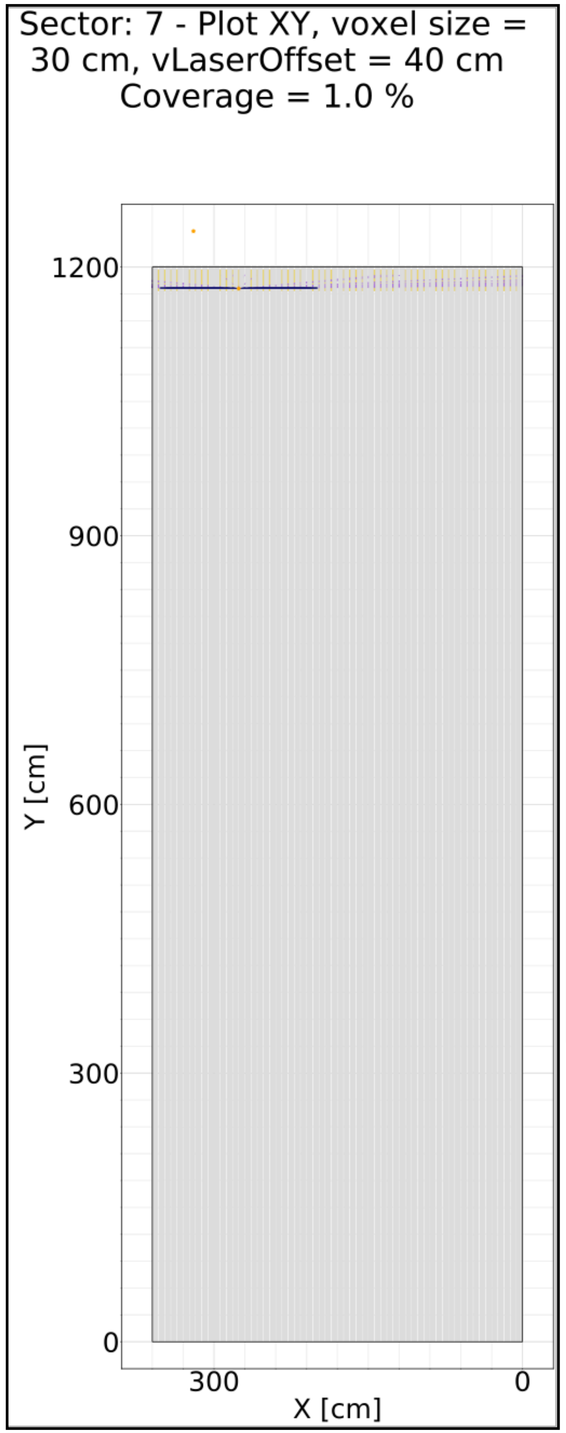


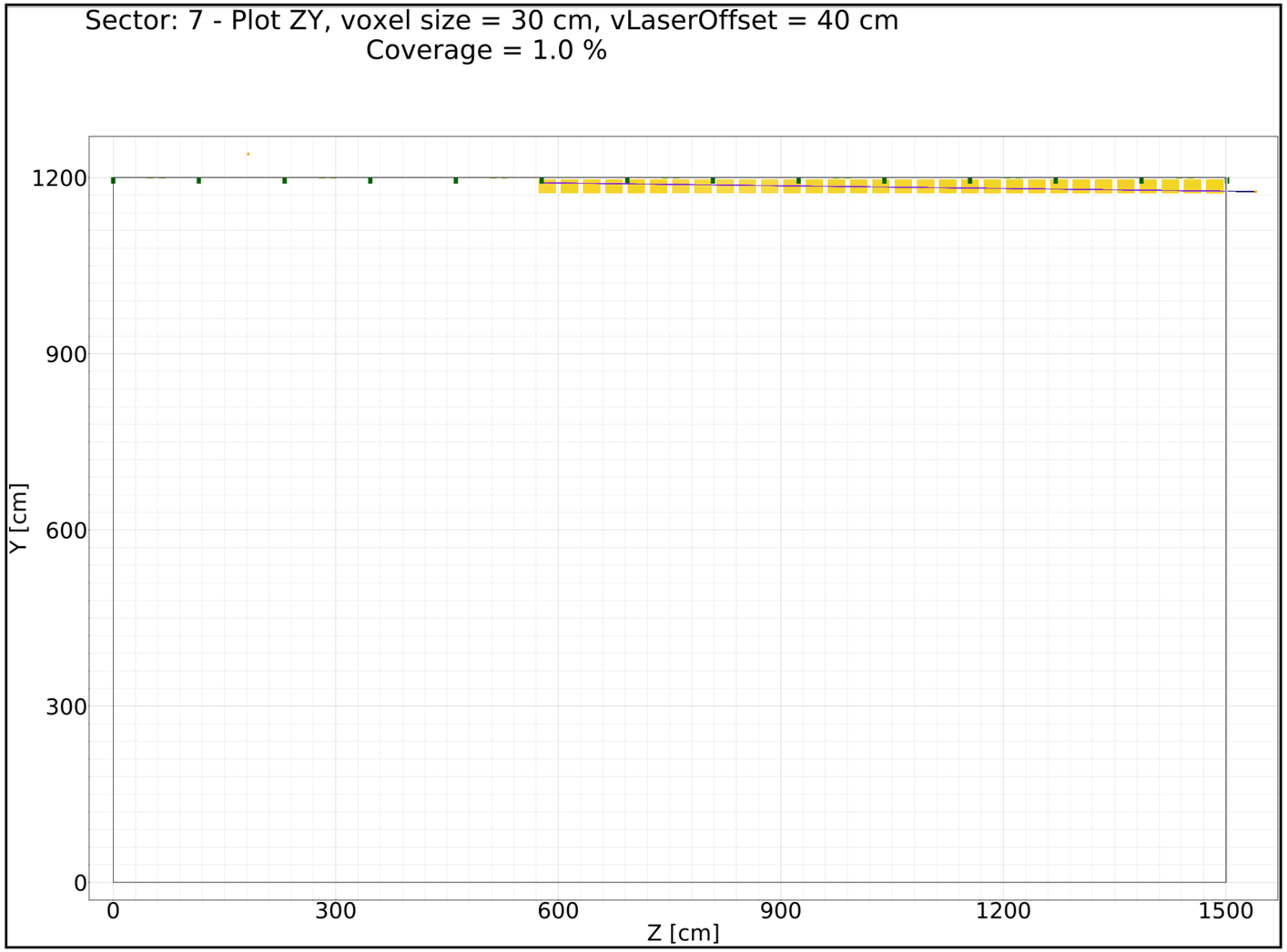


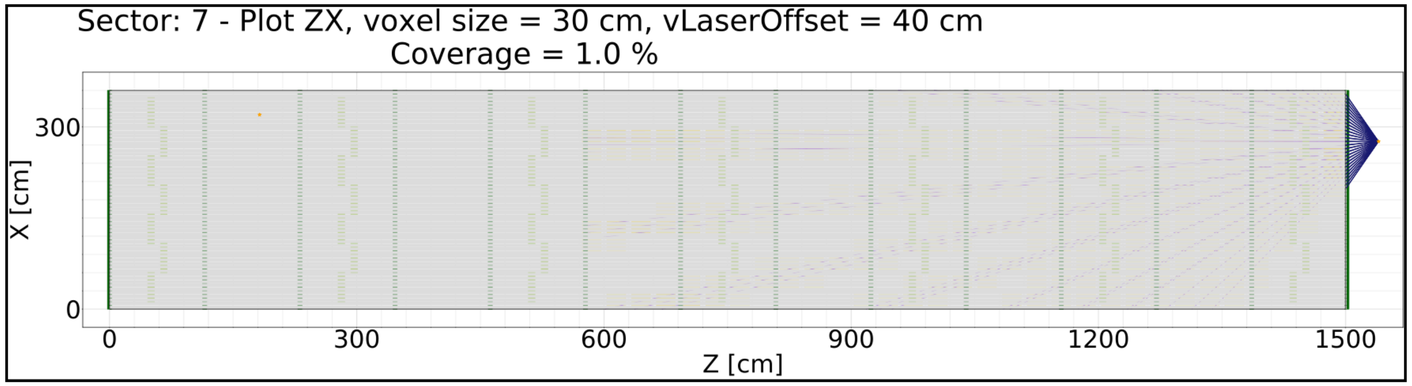


Step_00

- Correct x-propagation
- Hit Opposite corners



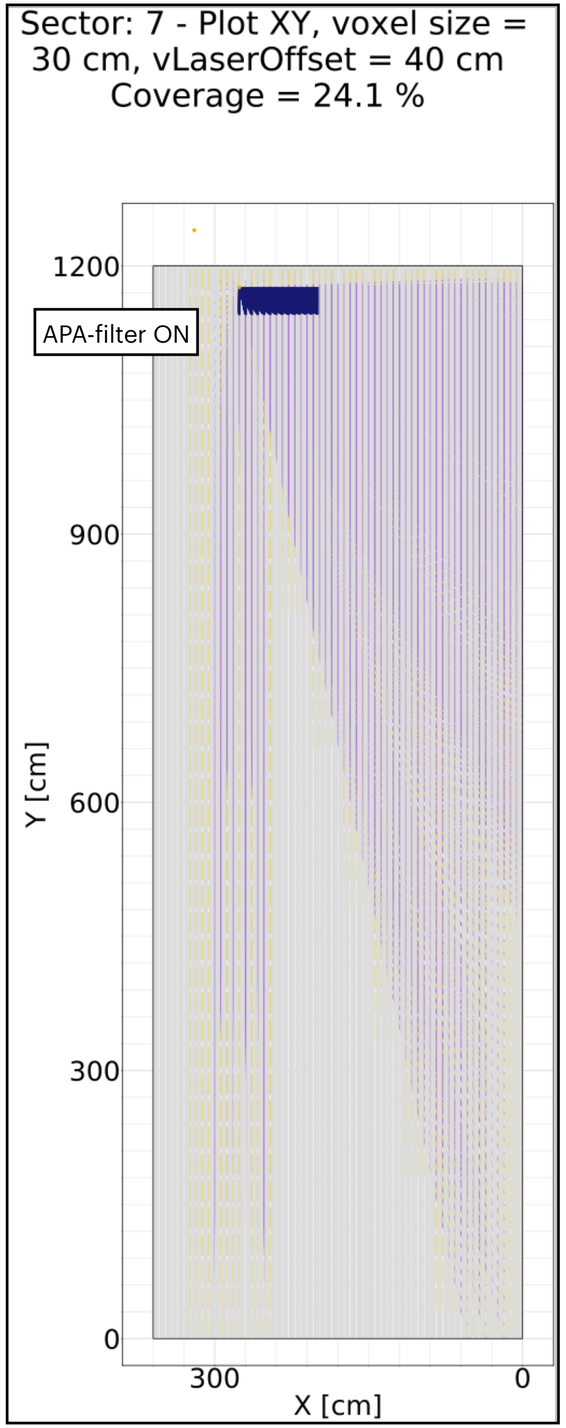


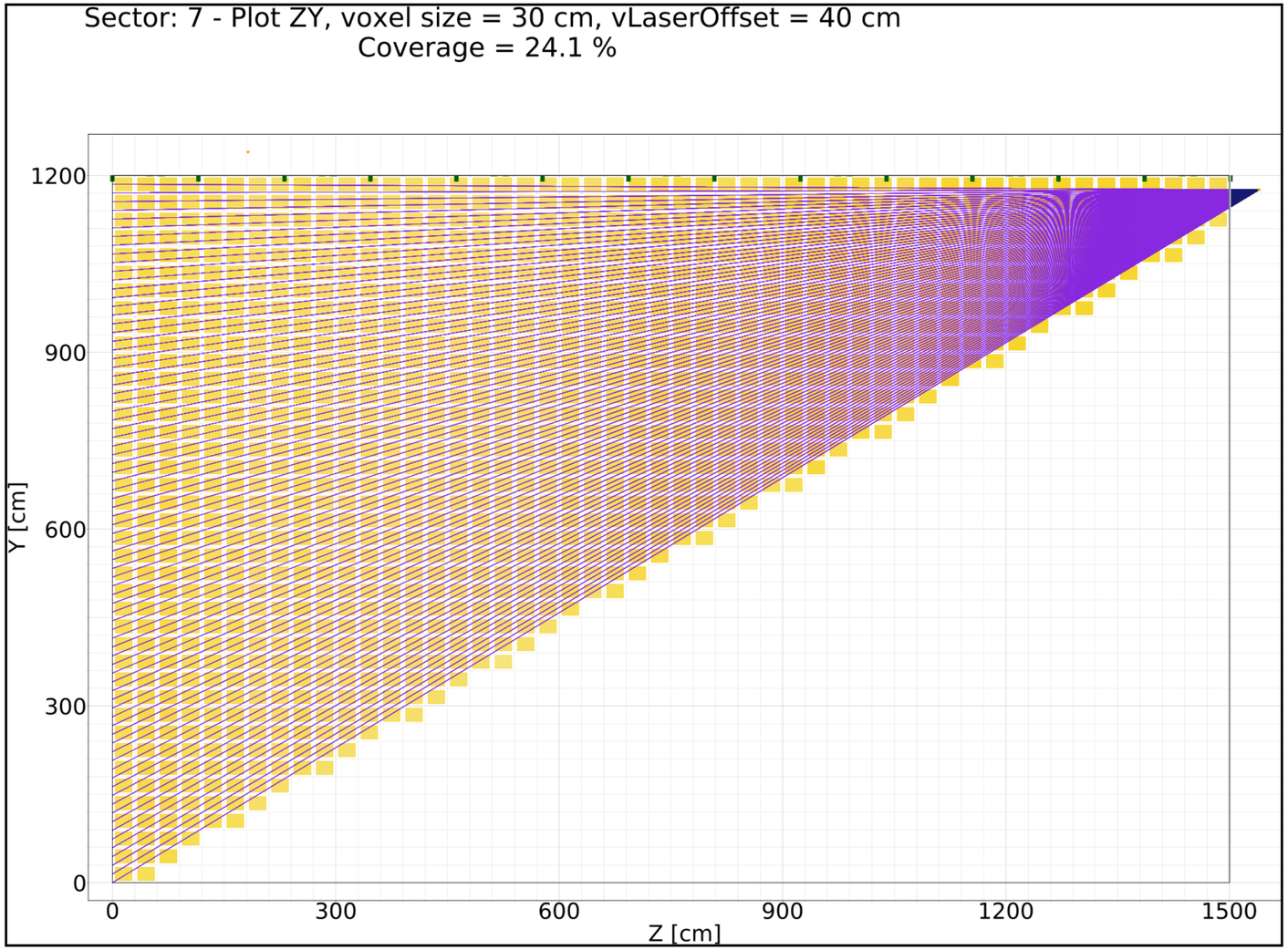


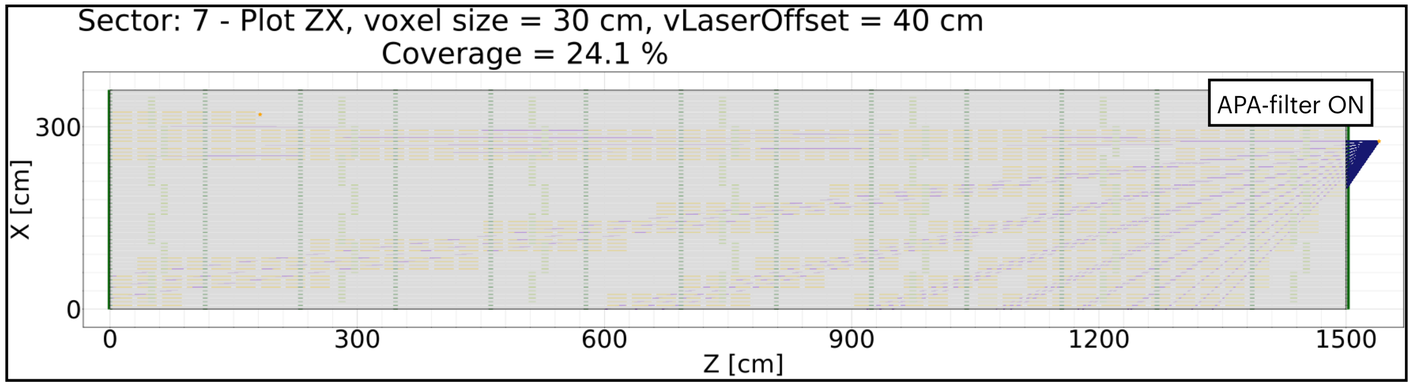
Step_00

- Correct x-propagation
- Hit Opposite corners

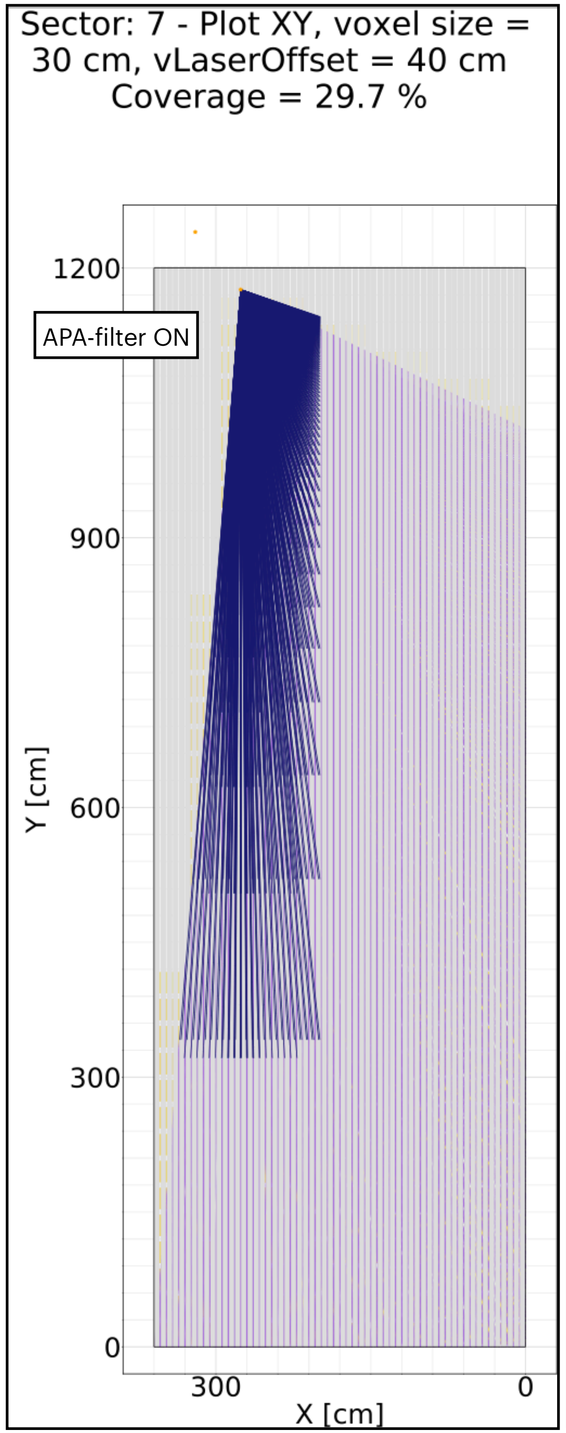
Step_01

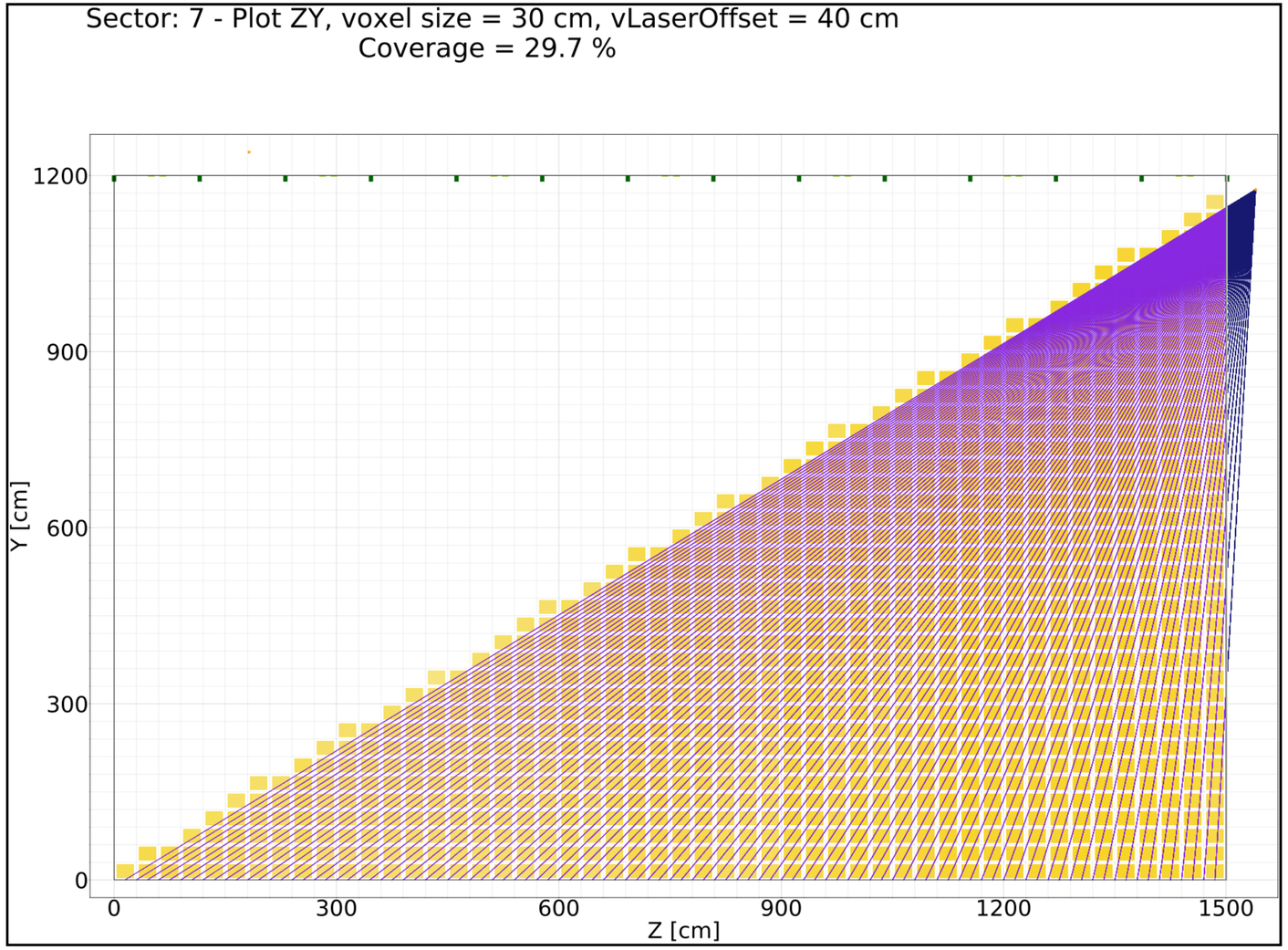


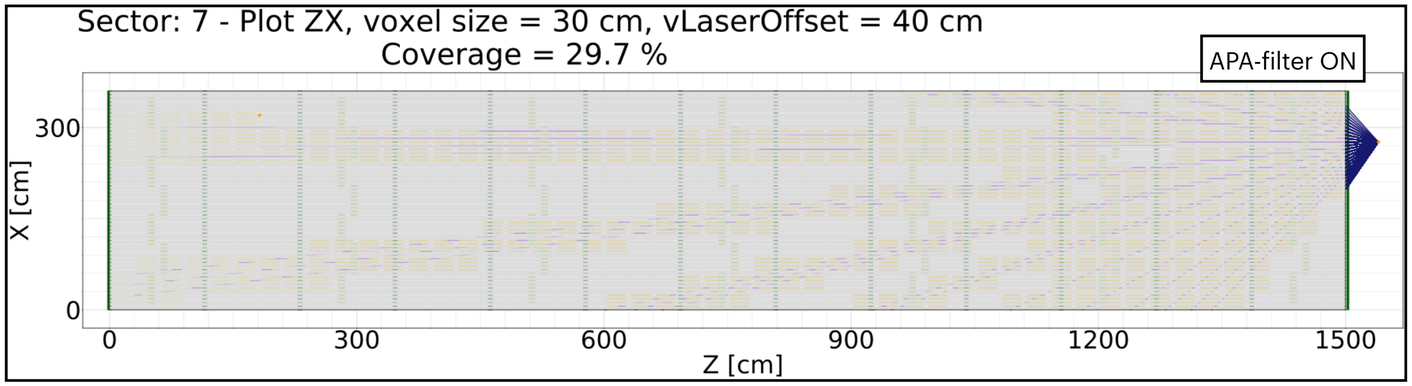




- Fill opposite side at the desired arrival density (given in input)



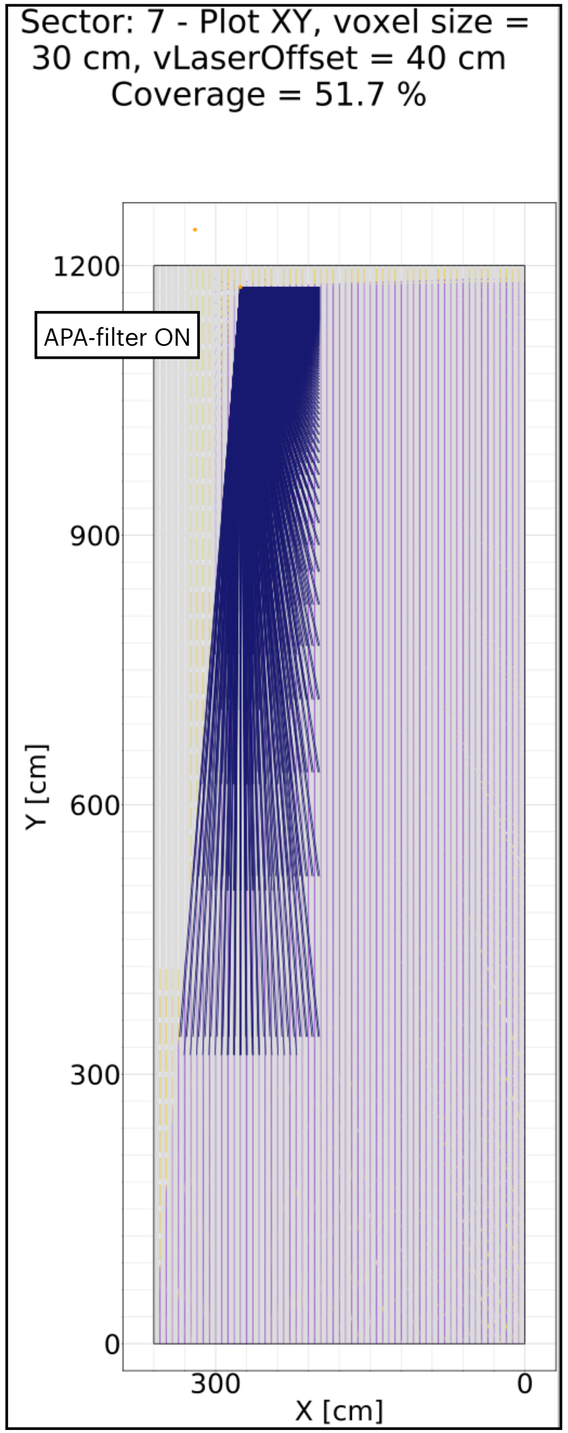


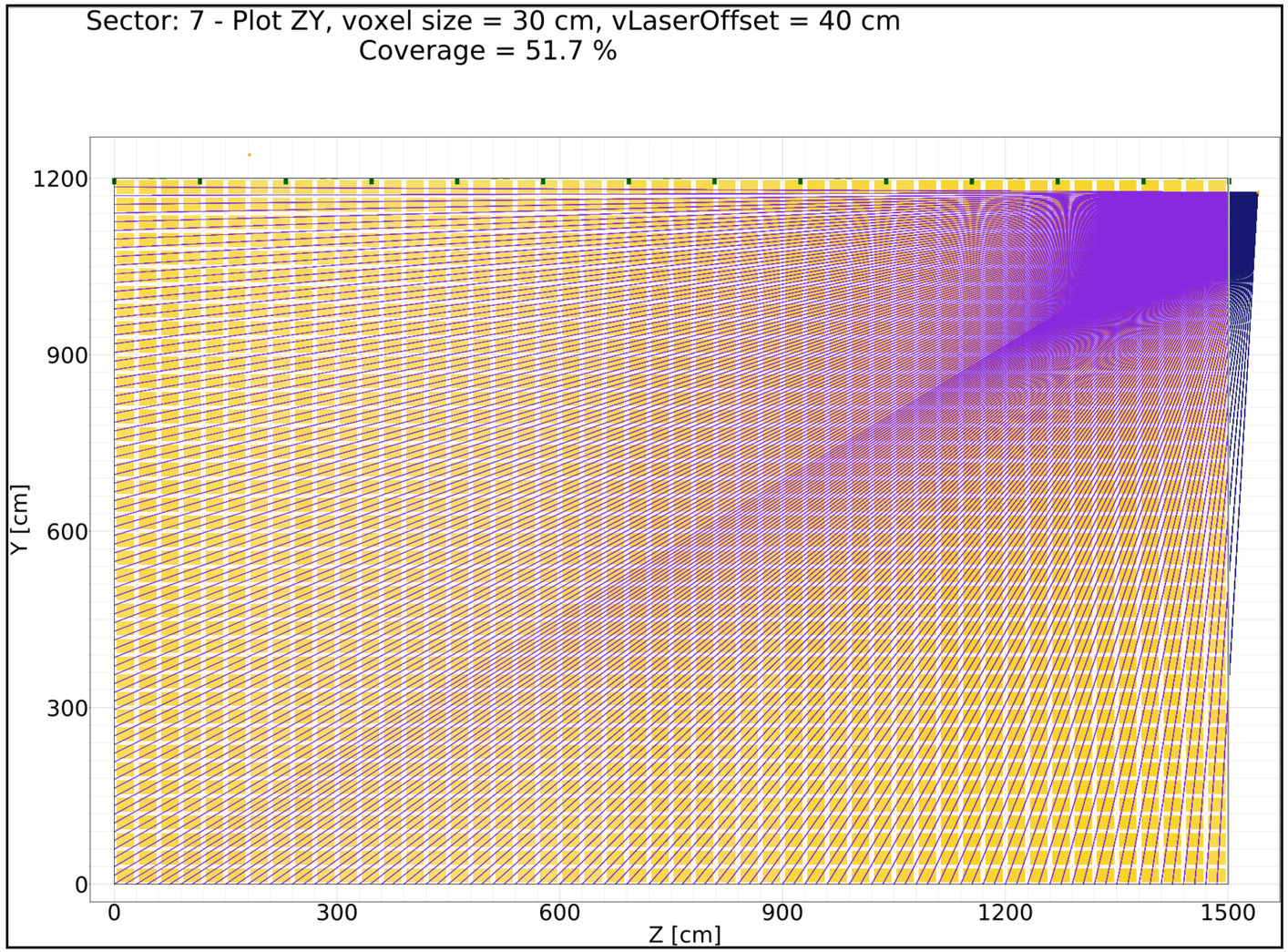


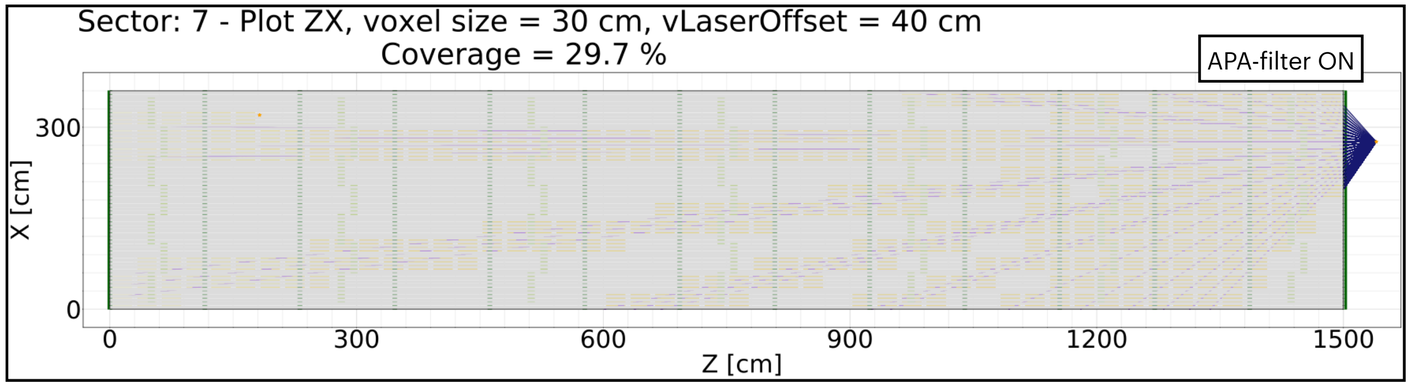
Step_02

- Fill detector floor at the desired arrival density (given in input)
- Apply reductions
- Effect of APA-filtering is no longer negligible as it was in the Top-FC case

Step_03



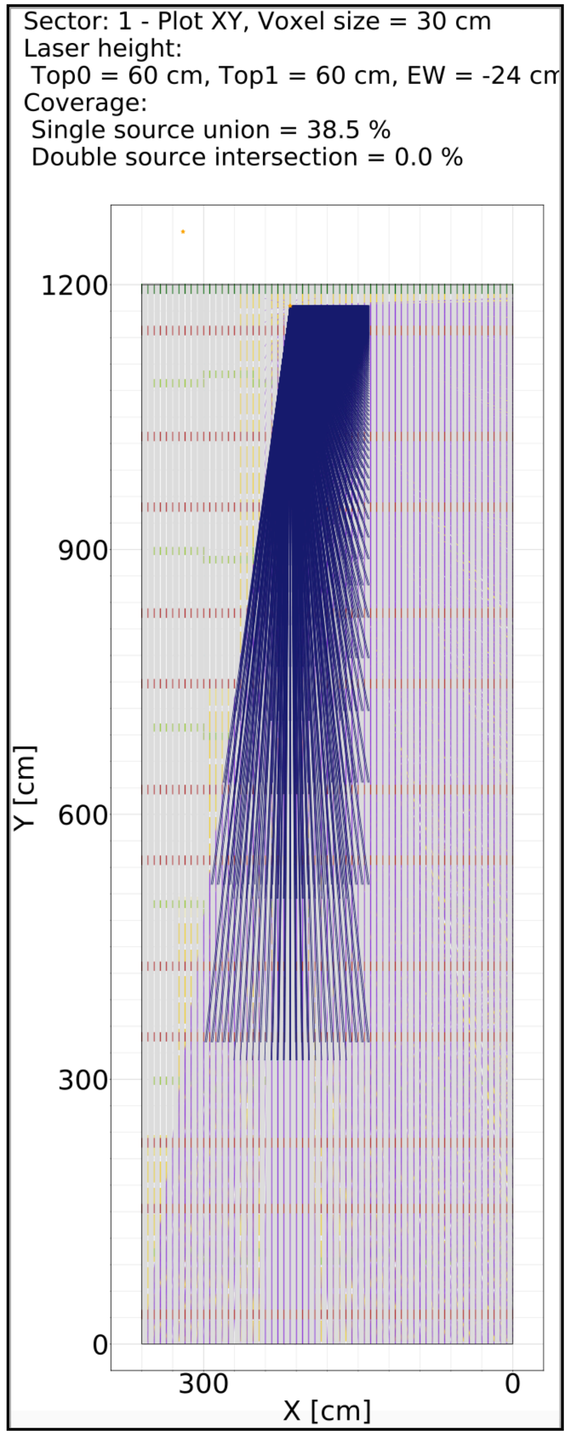


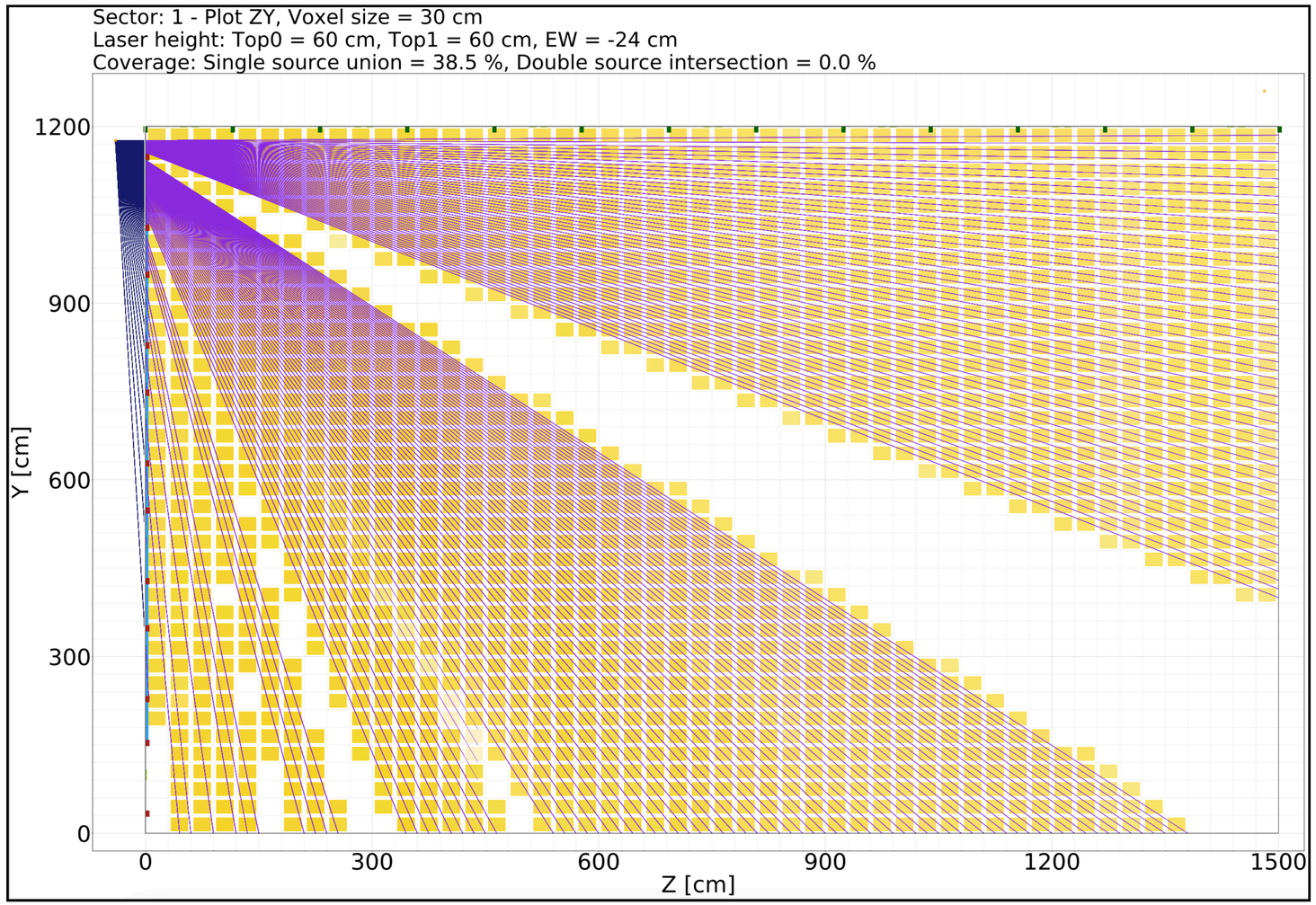


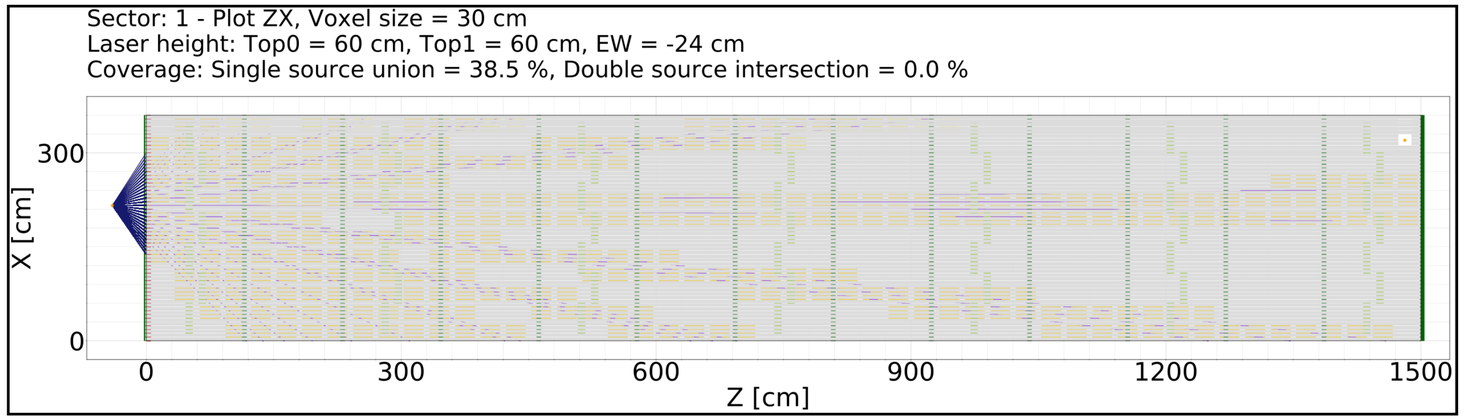
- Considering all the contributions

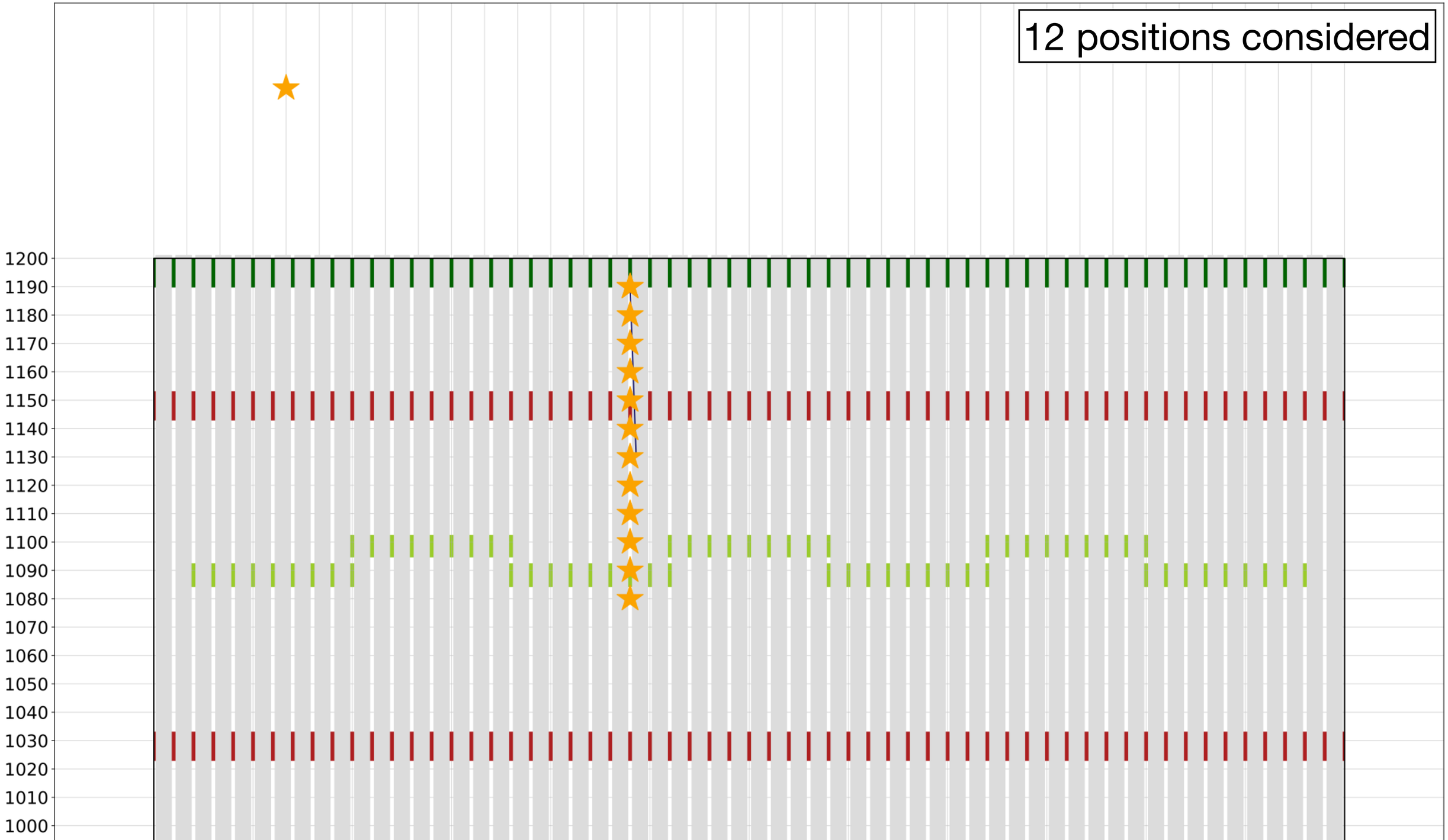
Step_04

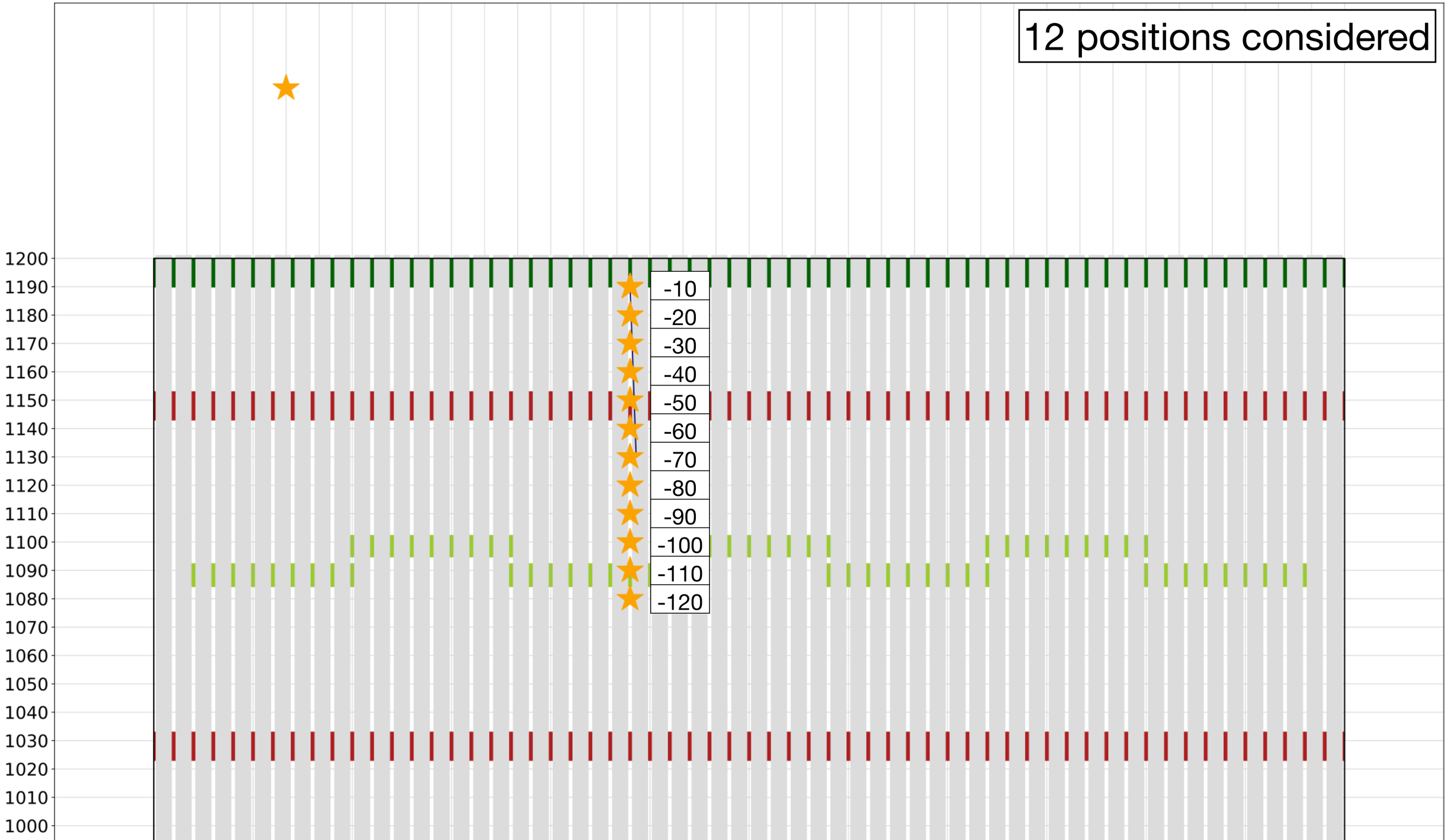
- Including obstacles



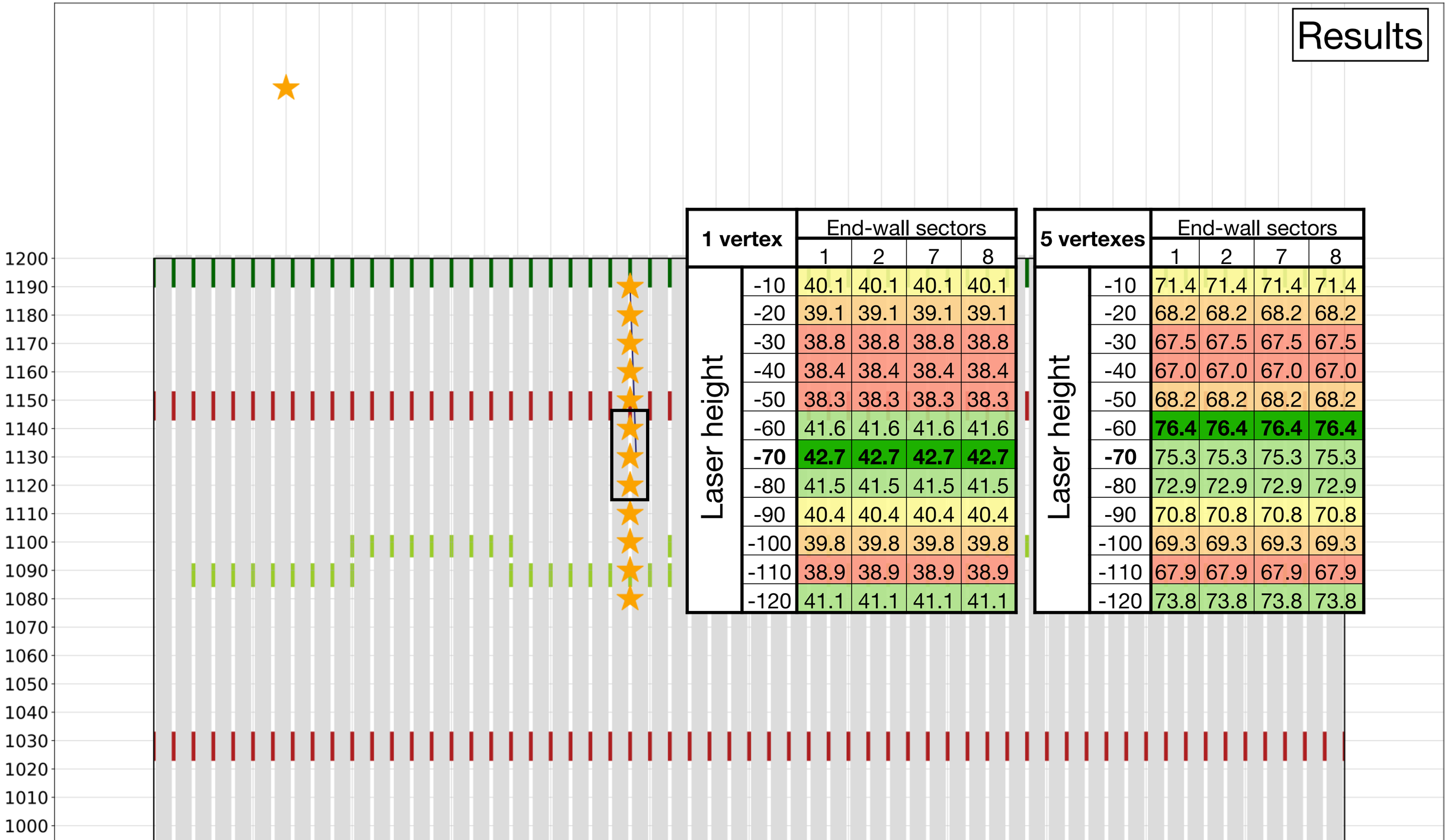





12 positions considered
1200
1190
1180
1170
1160
1150
1140
1130
1120
1110
1100
1090
1080
1070
1060
1050
1040
1030
1020
1010
1000


12 positions considered
1200
1190
1180
1170
1160
1150
1140
1130
1120
1110
1100
1090
1080
1070
1060
1050
1040
1030
1020
1010
1000
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120

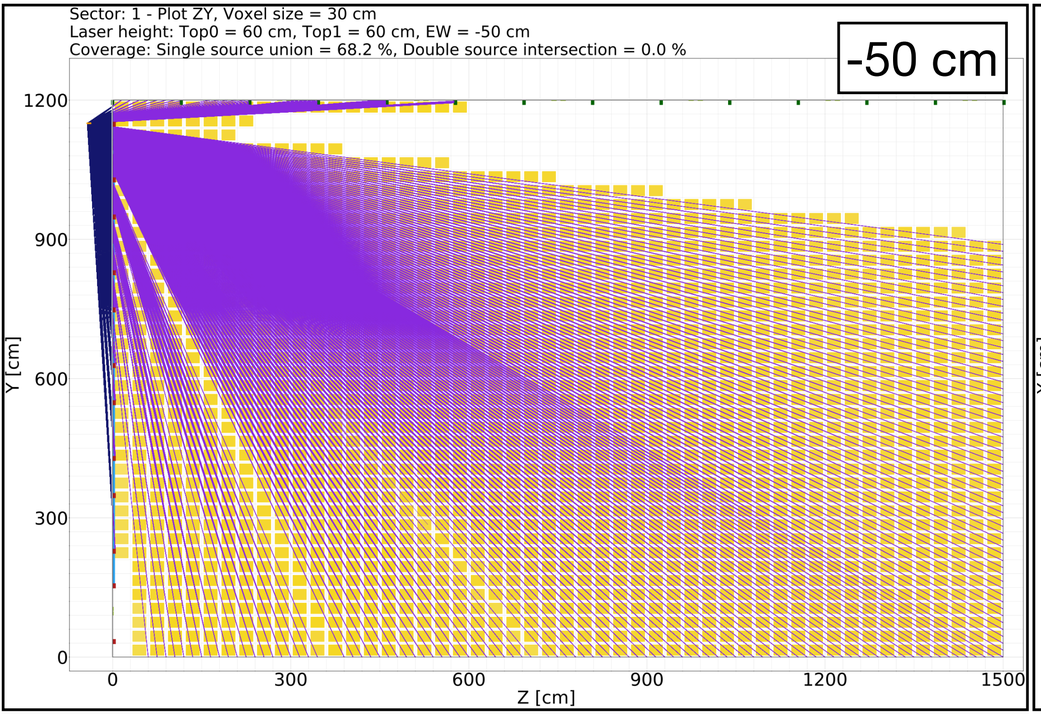
Results

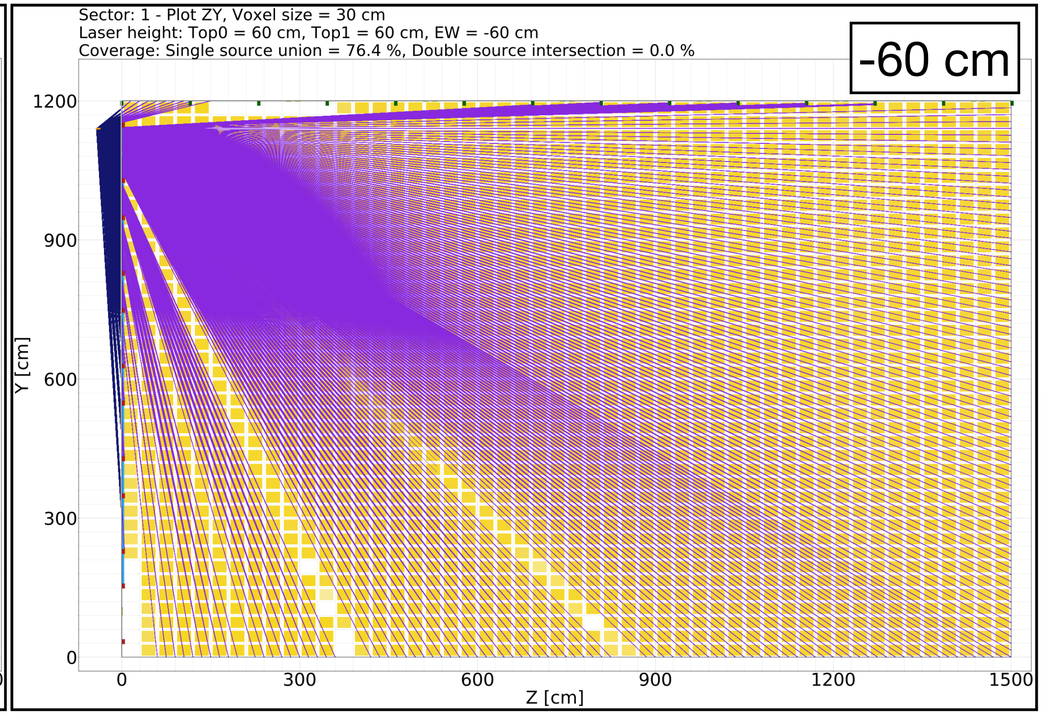


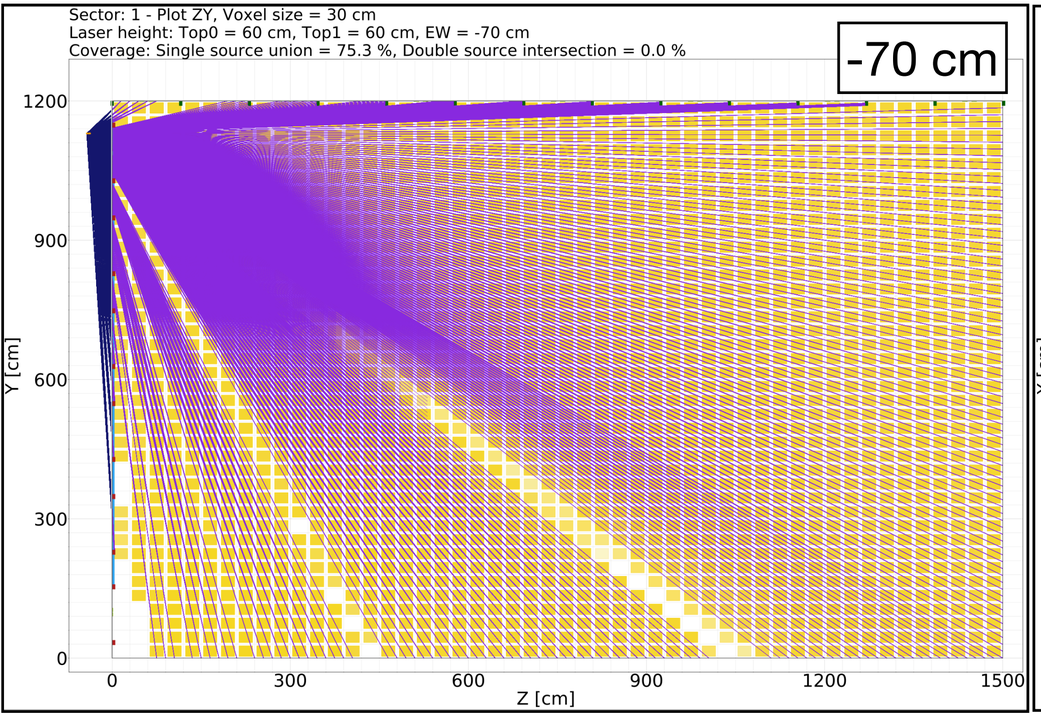
1 vertex		End-wall sectors			
		1	2	7	8
Laser height	-10	40.1	40.1	40.1	40.1
	-20	39.1	39.1	39.1	39.1
	-30	38.8	38.8	38.8	38.8
	-40	38.4	38.4	38.4	38.4
	-50	38.3	38.3	38.3	38.3
	-60	41.6	41.6	41.6	41.6
	-70	**42.7**	**42.7**	**42.7**	**42.7**
	-80	41.5	41.5	41.5	41.5
	-90	40.4	40.4	40.4	40.4
	-100	39.8	39.8	39.8	39.8
	-110	38.9	38.9	38.9	38.9
	-120	41.1	41.1	41.1	41.1

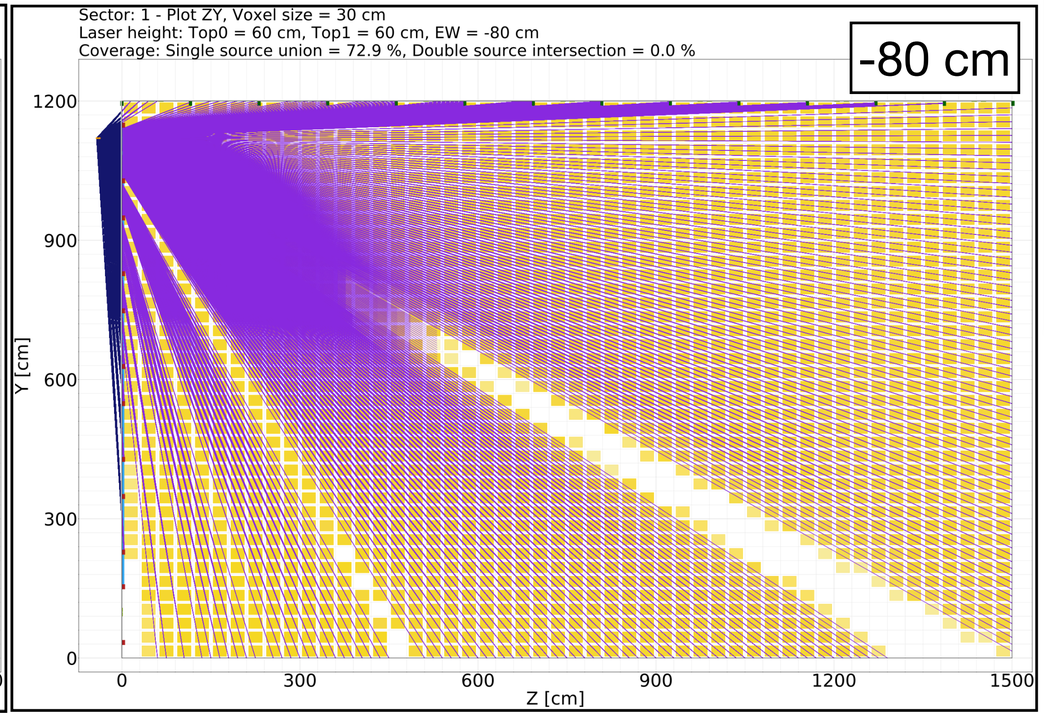
5 vertexes		End-wall sectors			
		1	2	7	8
Laser height	-10	71.4	71.4	71.4	71.4
	-20	68.2	68.2	68.2	68.2
	-30	67.5	67.5	67.5	67.5
	-40	67.0	67.0	67.0	67.0
	-50	68.2	68.2	68.2	68.2
	-60	**76.4**	**76.4**	**76.4**	**76.4**
	-70	75.3	75.3	75.3	75.3
	-80	72.9	72.9	72.9	72.9
	-90	70.8	70.8	70.8	70.8
	-100	69.3	69.3	69.3	69.3
	-110	67.9	67.9	67.9	67.9
	-120	73.8	73.8	73.8	73.8

Results









5 vertexes		End-wall sectors			
		1	2	7	8
Laser height	-10	71.4	71.4	71.4	71.4
	-20	68.2	68.2	68.2	68.2
	-30	67.5	67.5	67.5	67.5
	-40	67.0	67.0	67.0	67.0
	-50	68.2	68.2	68.2	68.2
	-60	**76.4**	**76.4**	**76.4**	**76.4**
	-70	75.3	75.3	75.3	75.3
	-80	72.9	72.9	72.9	72.9
	-90	70.8	70.8	70.8	70.8
	-100	69.3	69.3	69.3	69.3
	-110	67.9	67.9	67.9	67.9
	-120	73.8	73.8	73.8	73.8