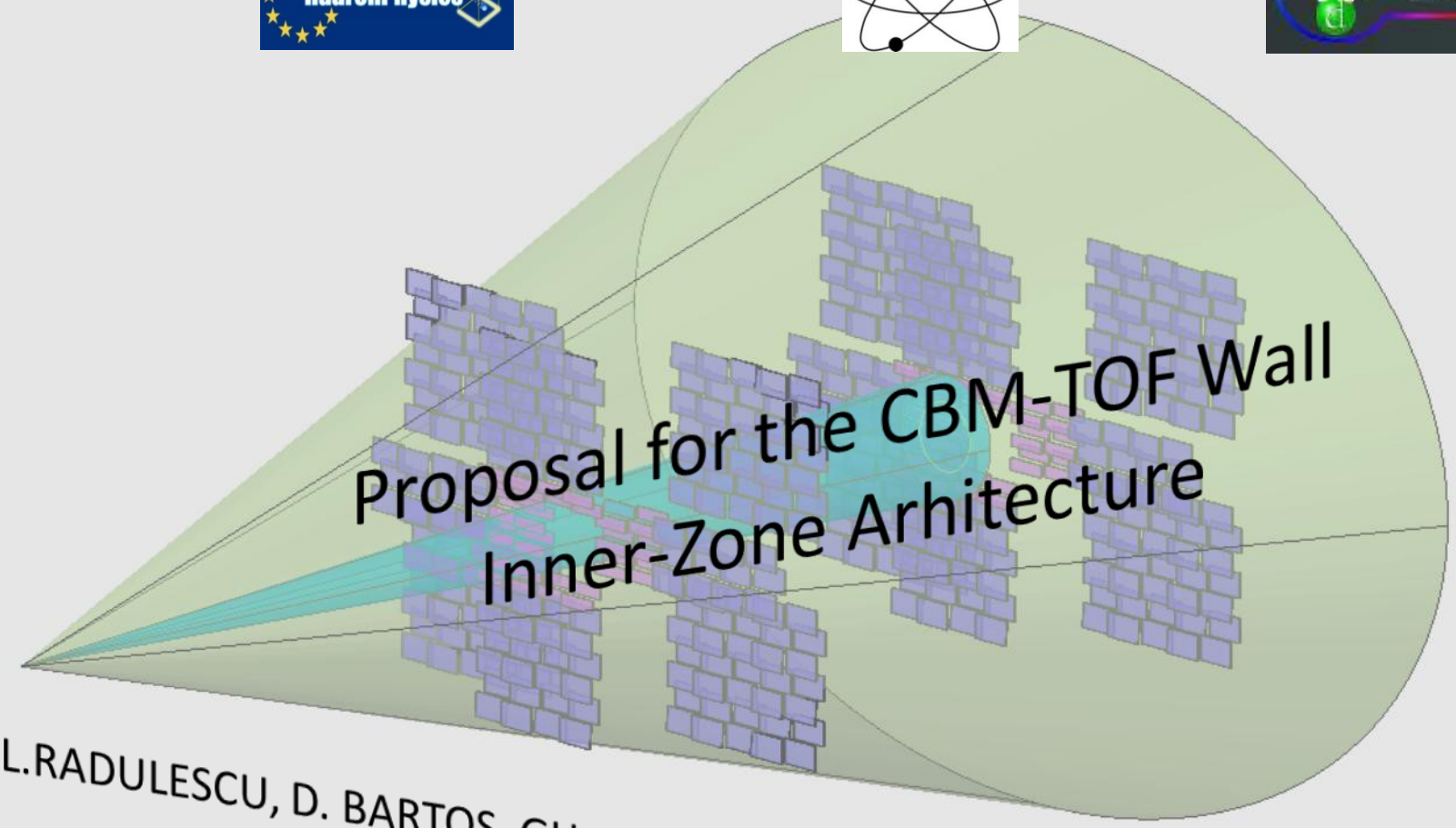

Proposal for the CBM-TOF Wall Inner-Zone Arhitecture

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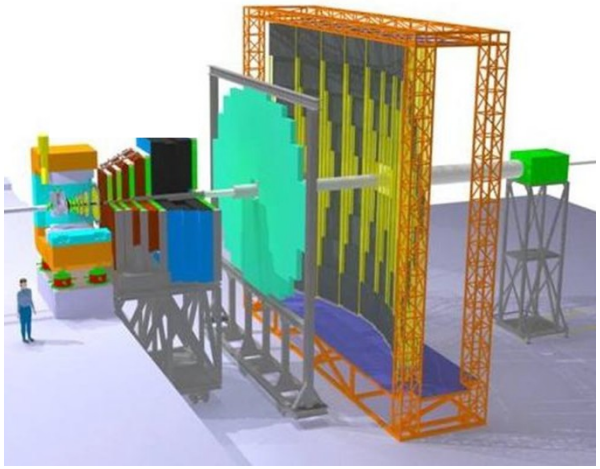
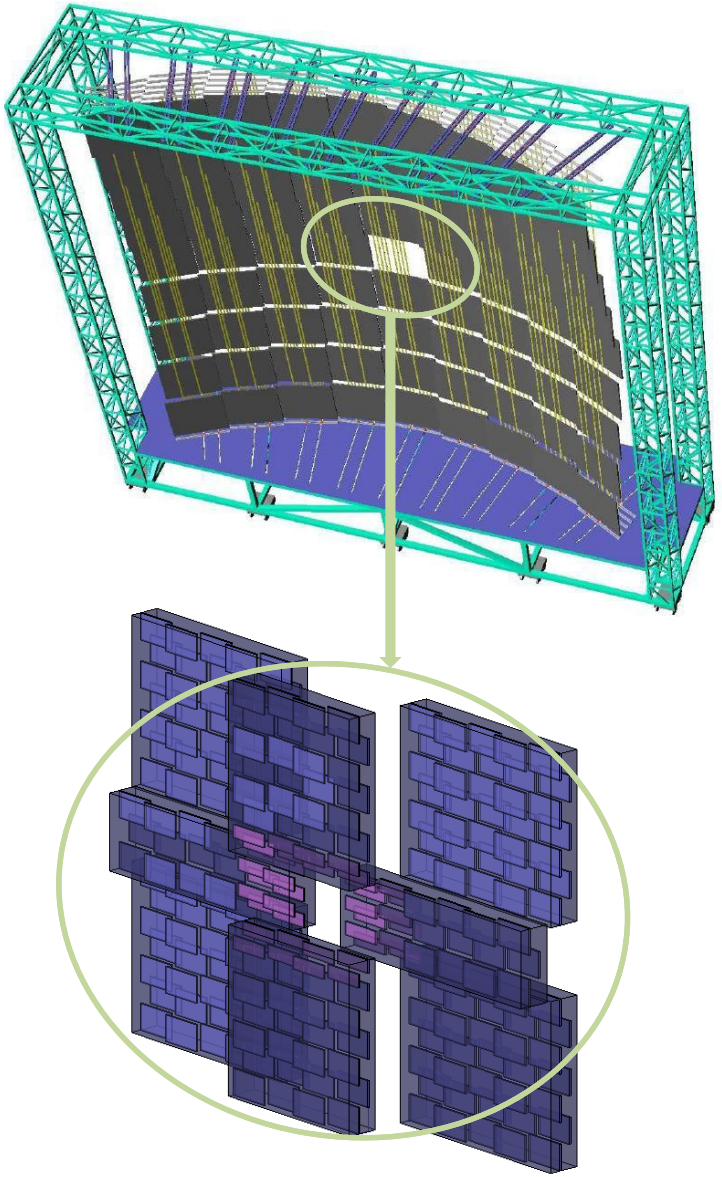
"Horia Hulubei" National Institute of Physics and Nuclear Engineering, Bucharest-Magurele, Romania

CBM Collaboration Meeting, Dubna, 23-27 September 2013

CBM-TOF Wall Inner Zone

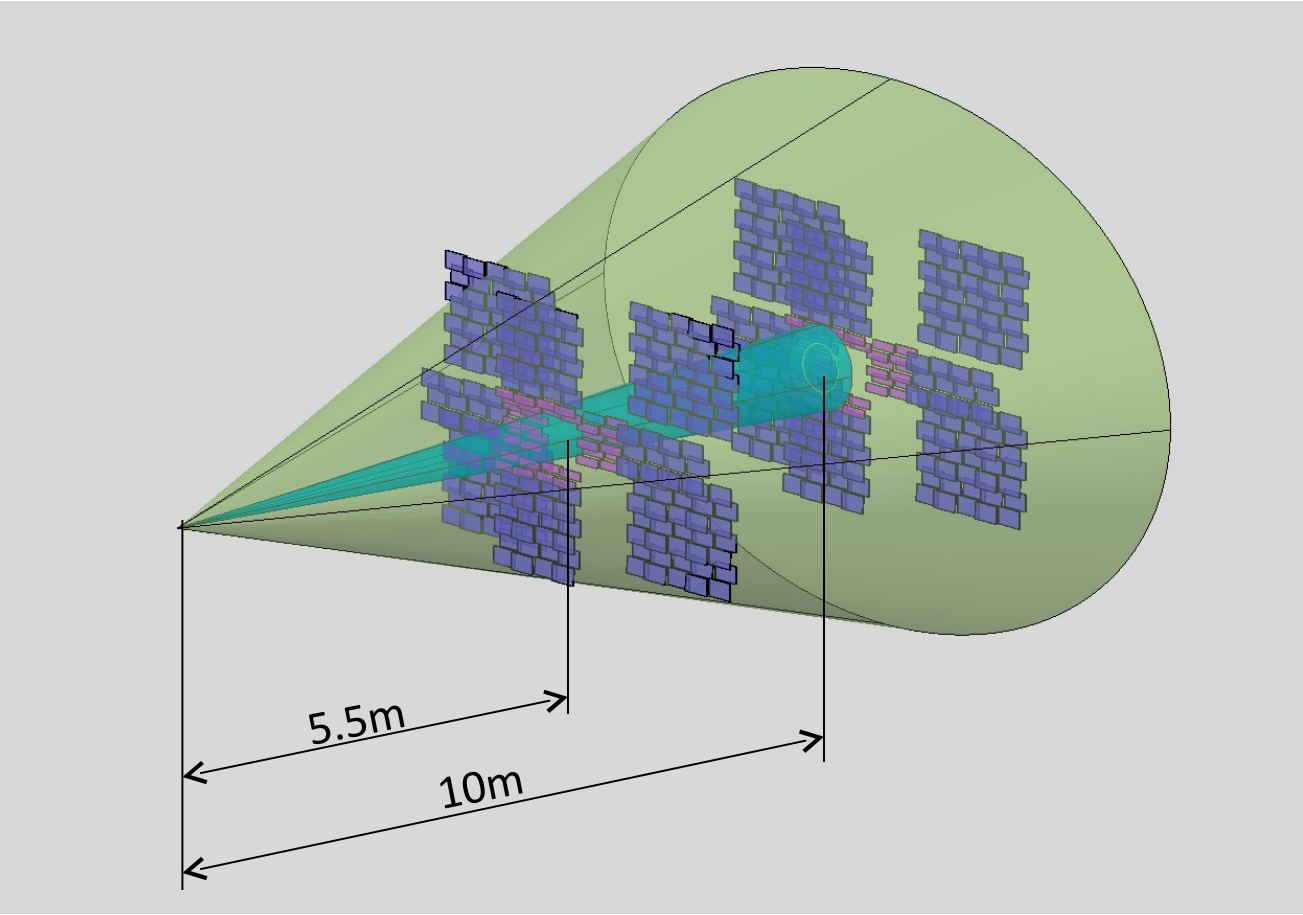




The design of the inner zone is based on multigap RPC cells with signal read out on multistrip electrodes;

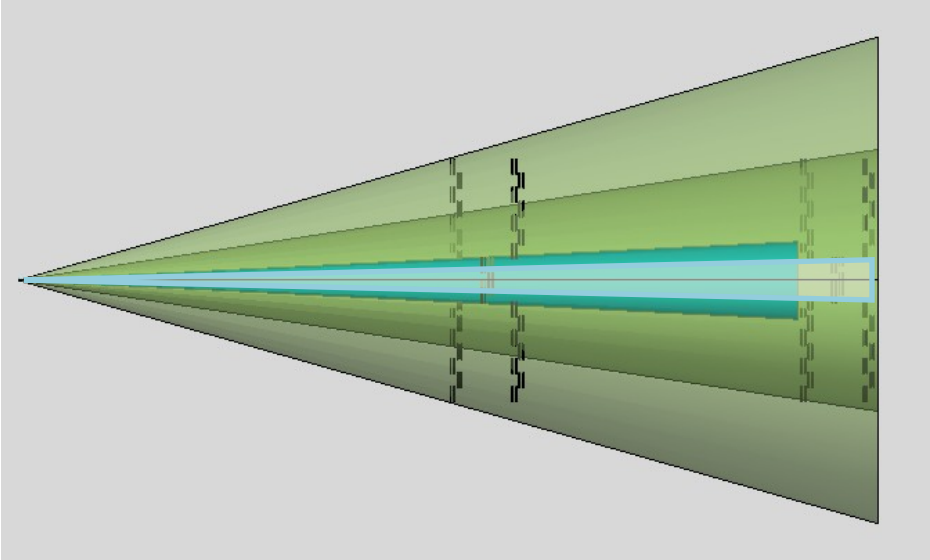
The RPC prototype conserves a time resolution $\sigma_t \leq 80$ps and an efficiency >95%, up to 100kHz/cm^2 counting rate;

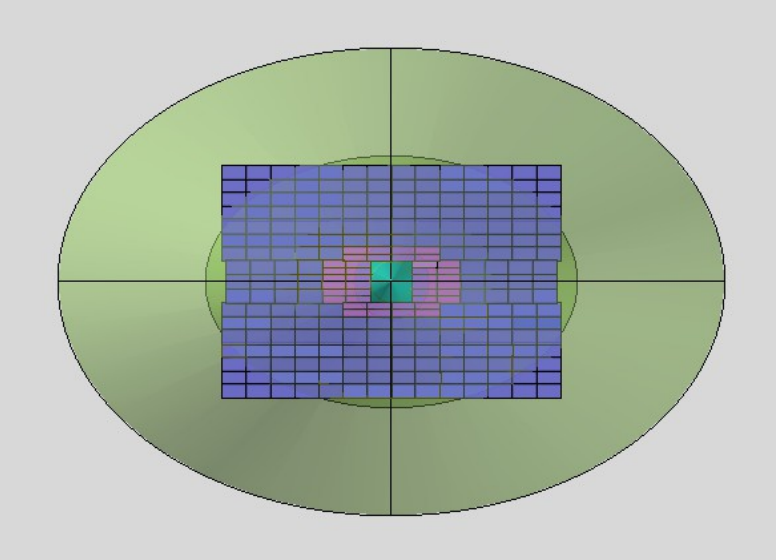
The design of the inner zone of the wall should provide a maximum detection geometric efficiency in both cases (SIS 100 and SIS 300);



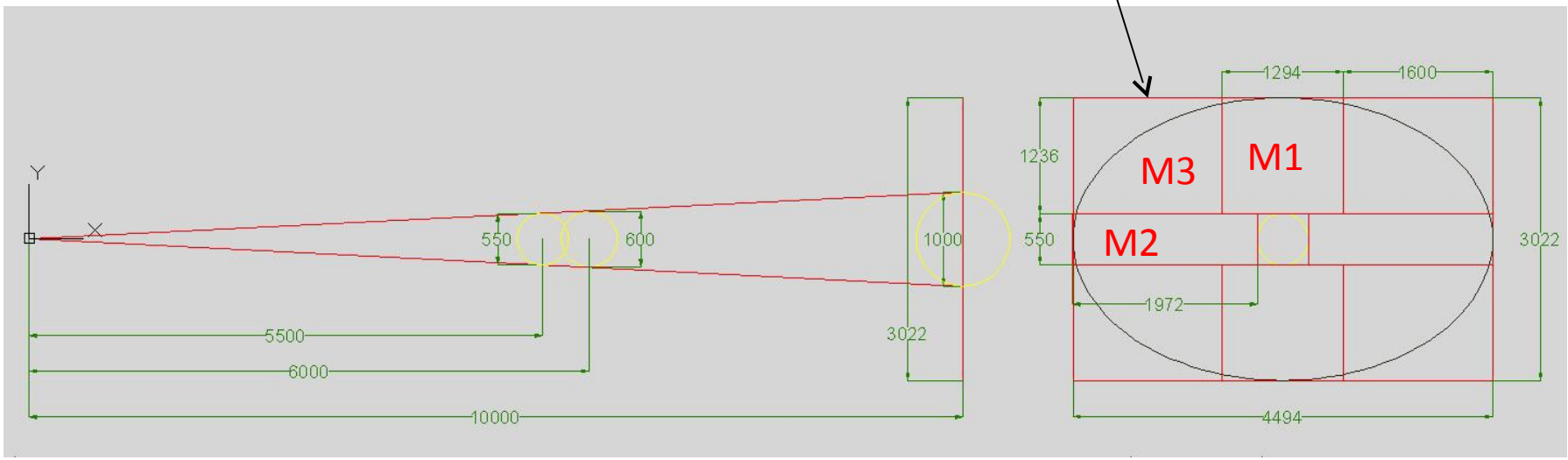
The cells overlap should be minimum, in order to reduce the redundant number of readout channels;

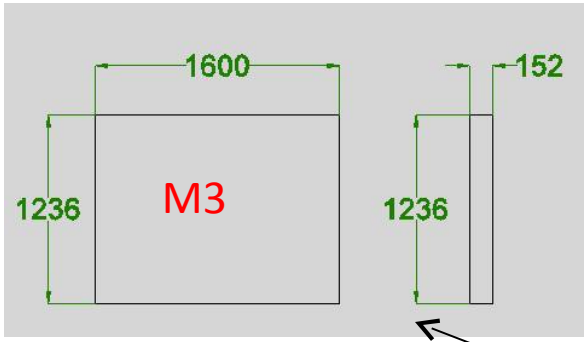
Side view and front view of the inner zone

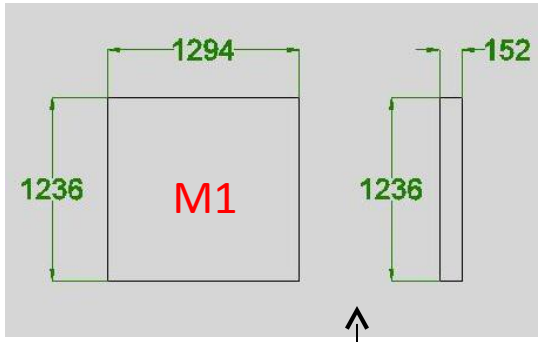


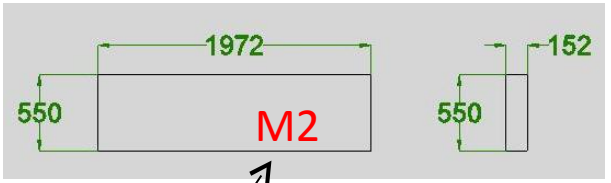


Active area of the wall



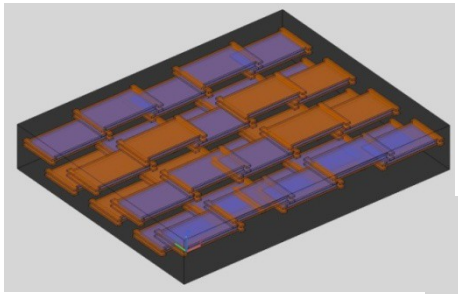




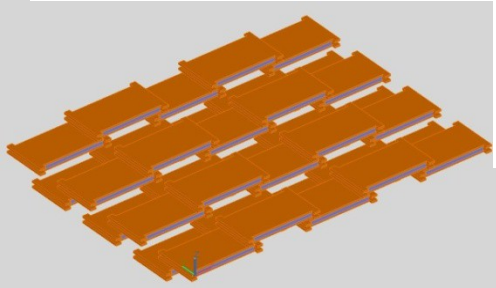


Estimated size of the active area of each module

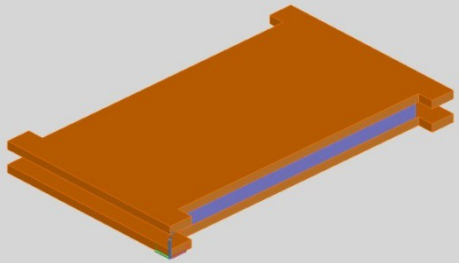
The Supermodule



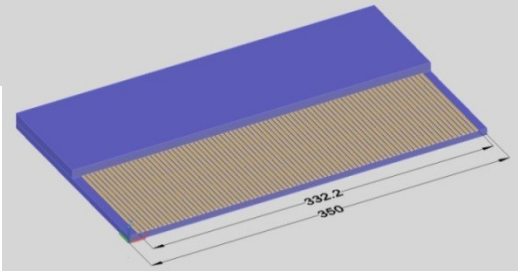
The cells arrangement



The cell



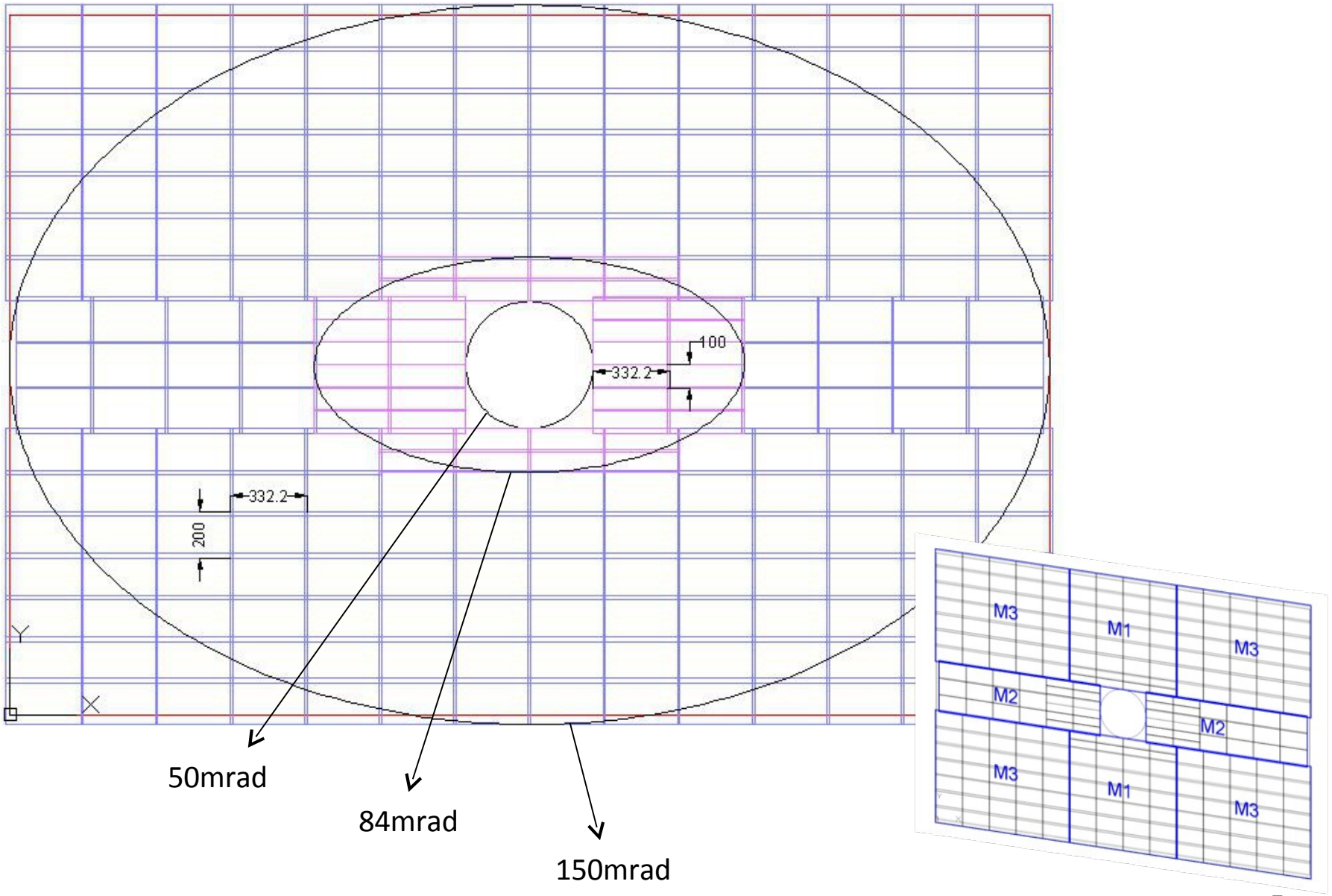
The glass electrodes



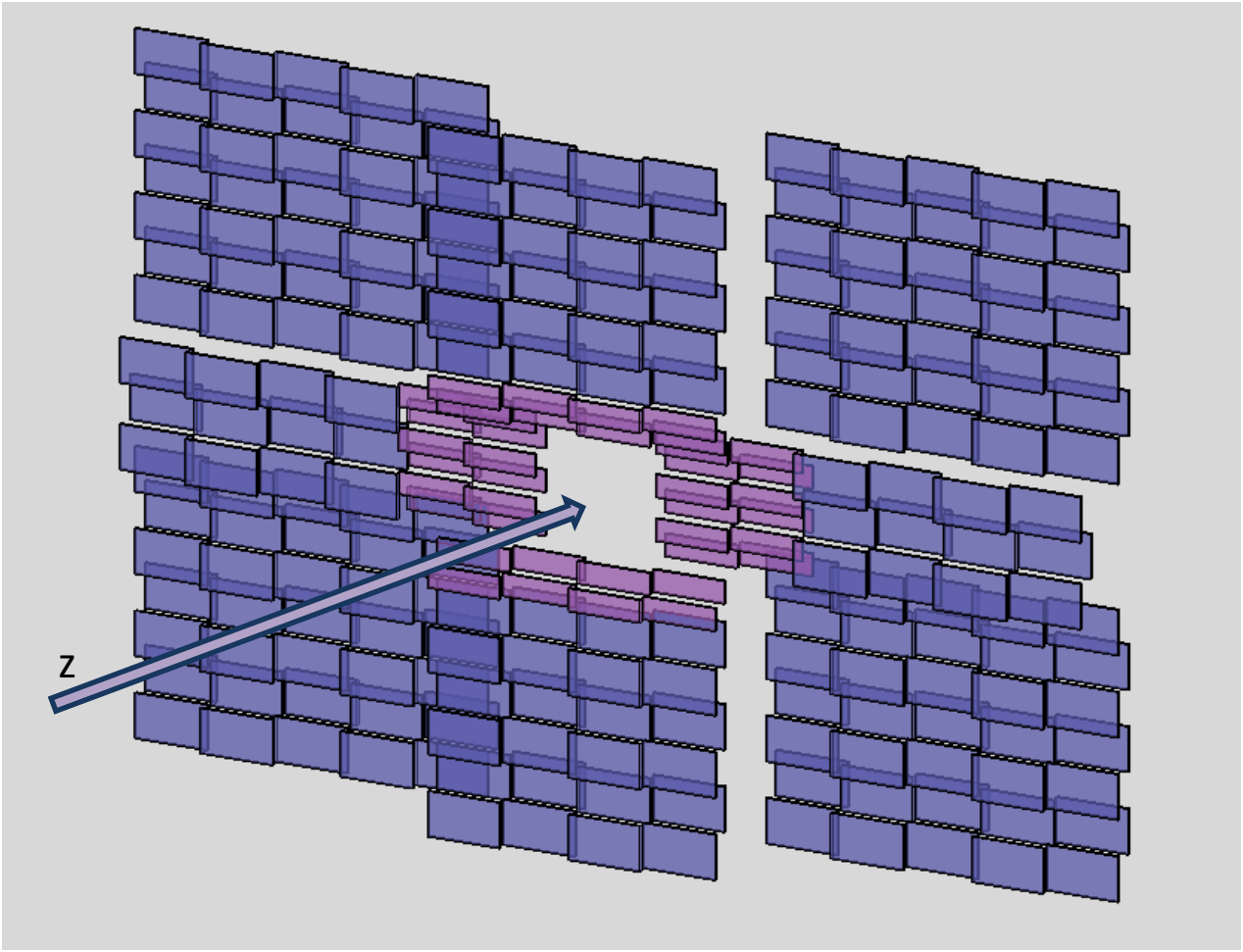
- Length: 350 mm; Active area length: 332.2 mm (between side strips)
- Width: 100 mm (between 50mrad and 84mrad)
  200 mm (between 84mrad and 150mrad)
- Thickness: 1 mm

strip pitch: 2.159(w)+2.032(g) ➡ 4.191 mm (100 Ohm strip impedance)

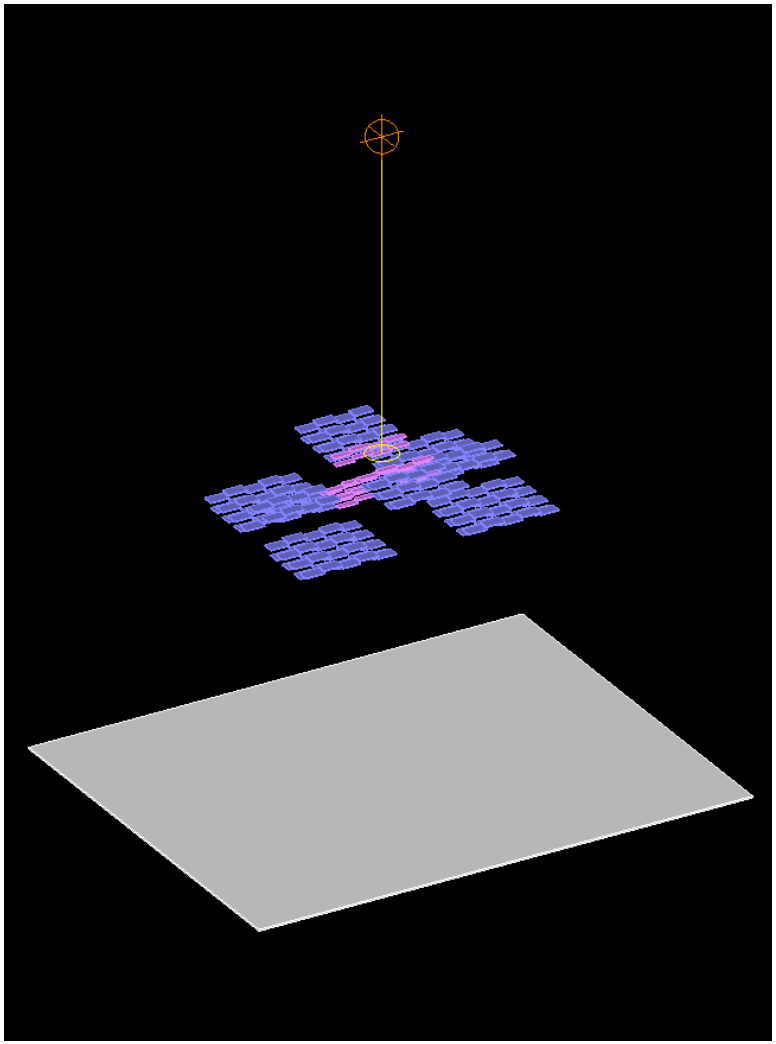
Front view of the inner zone of CBM-TOF based on the available size of glass electrodes

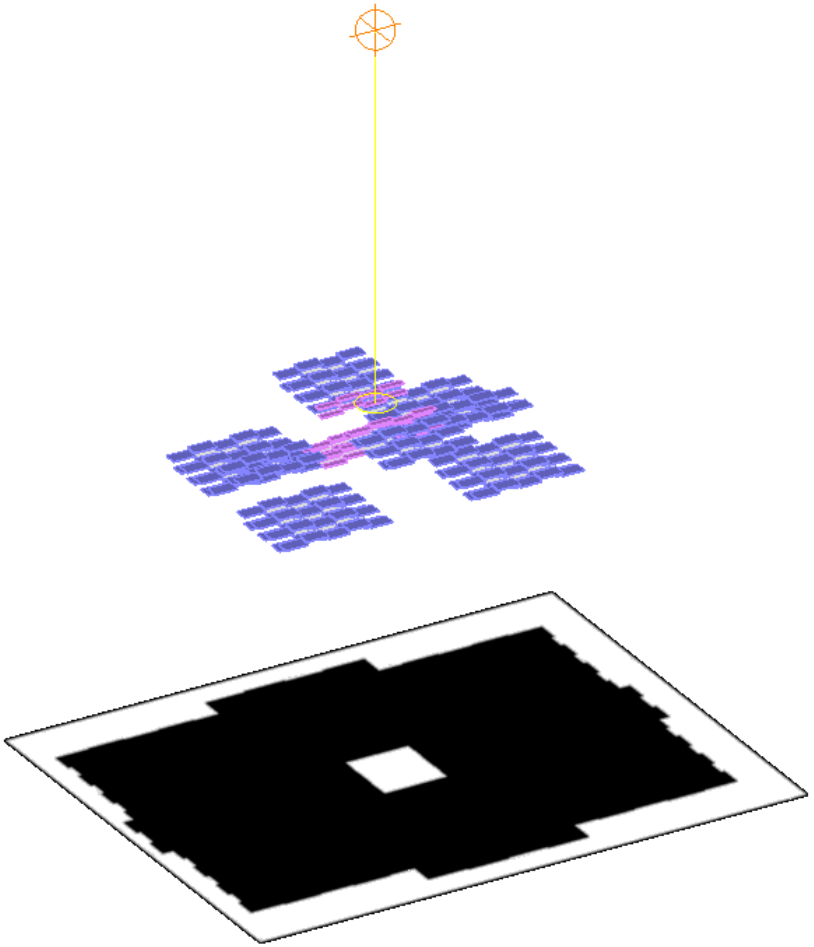


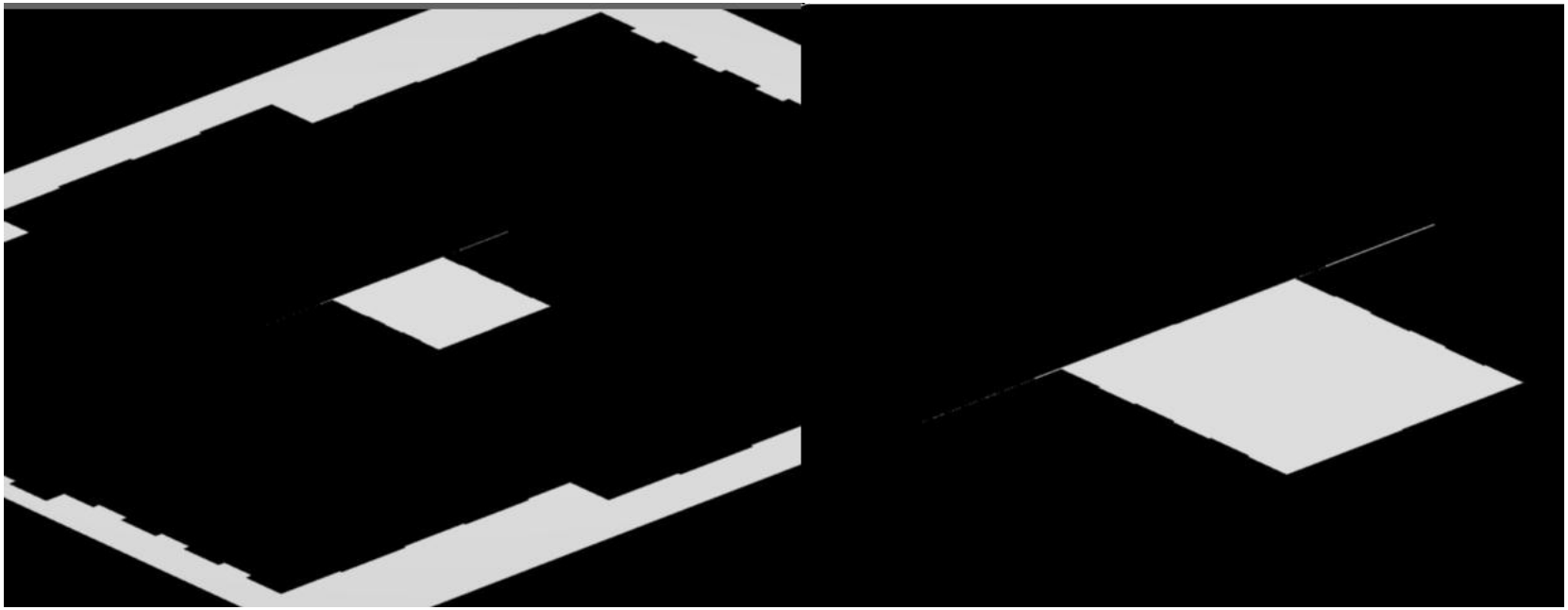
The 3D inner zone (detection volume)

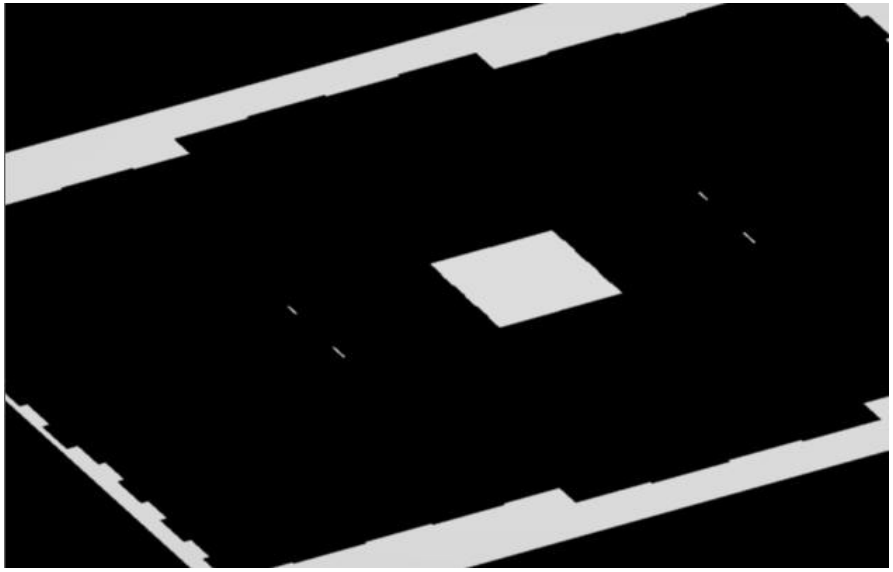


Optimized coverage using a light source at 5.5m from the wall



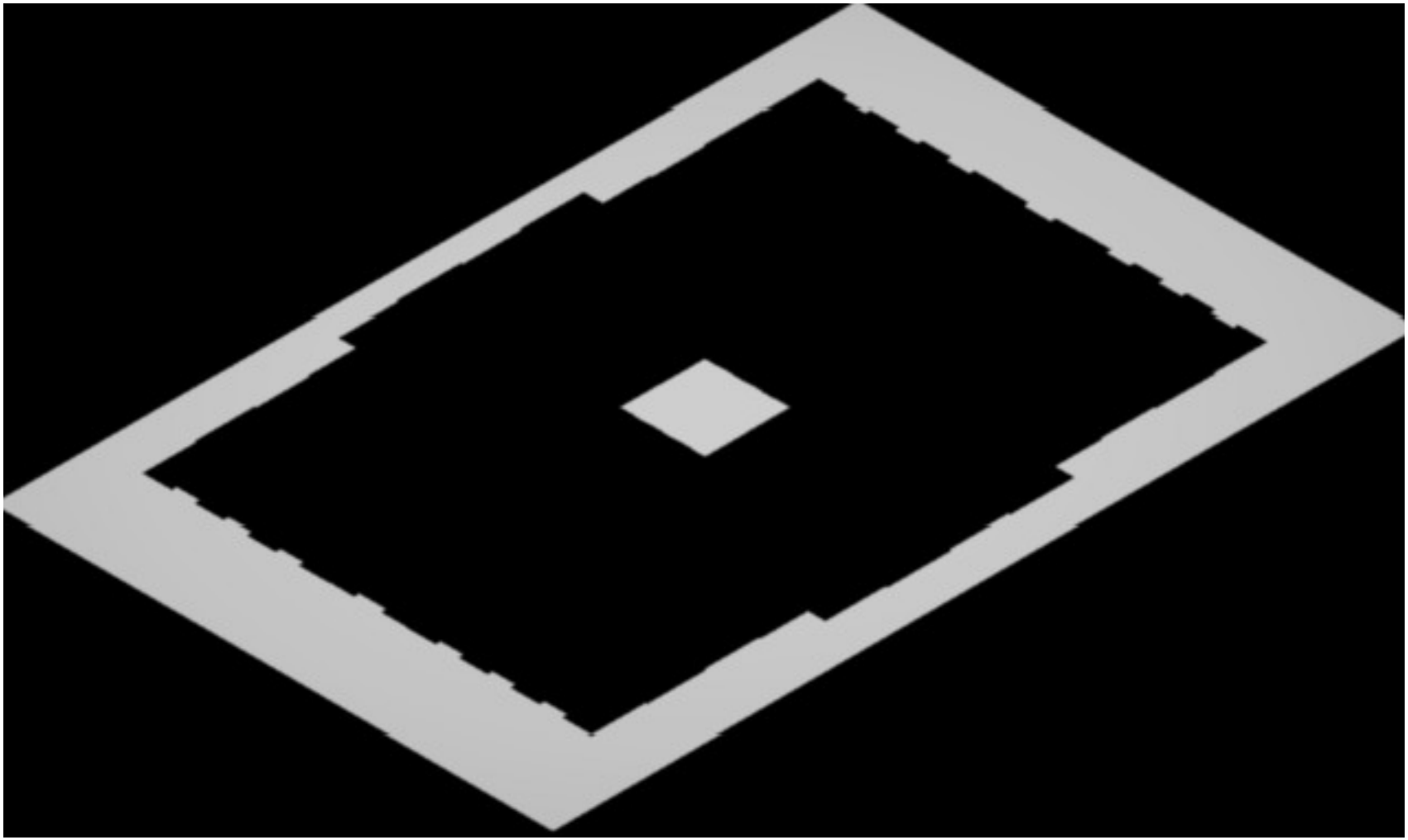




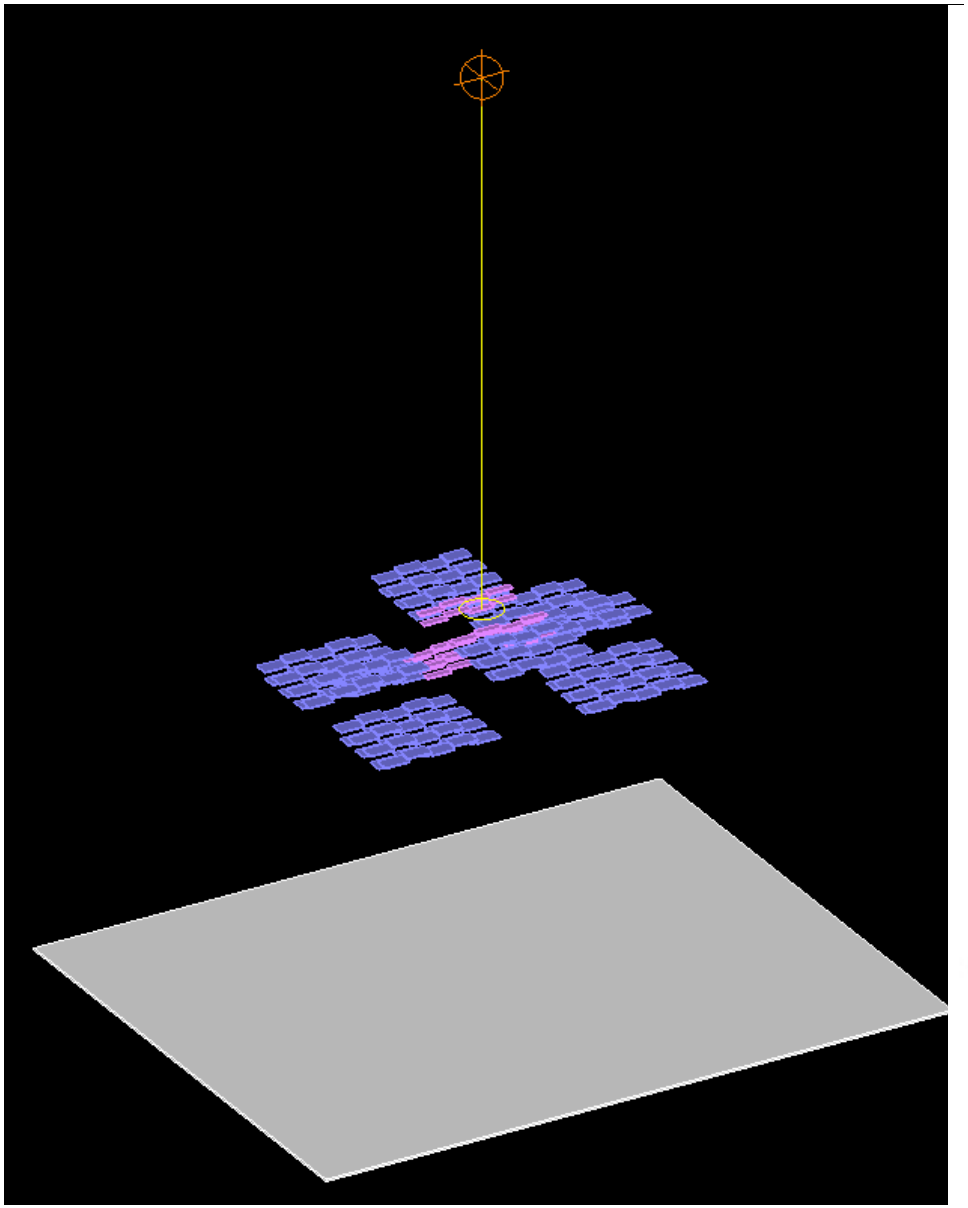


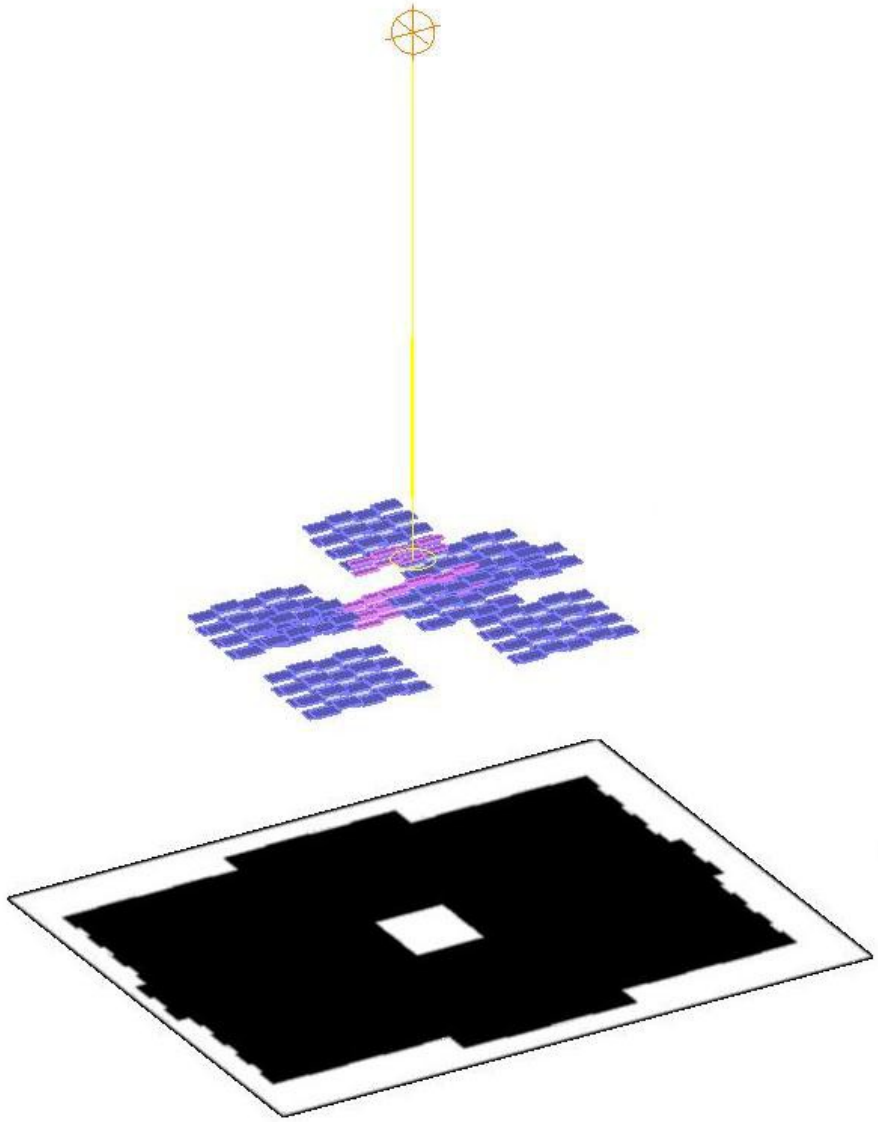
The shadow with holes
(coverage discontinuity)

The shadow without holes (properly coverage)

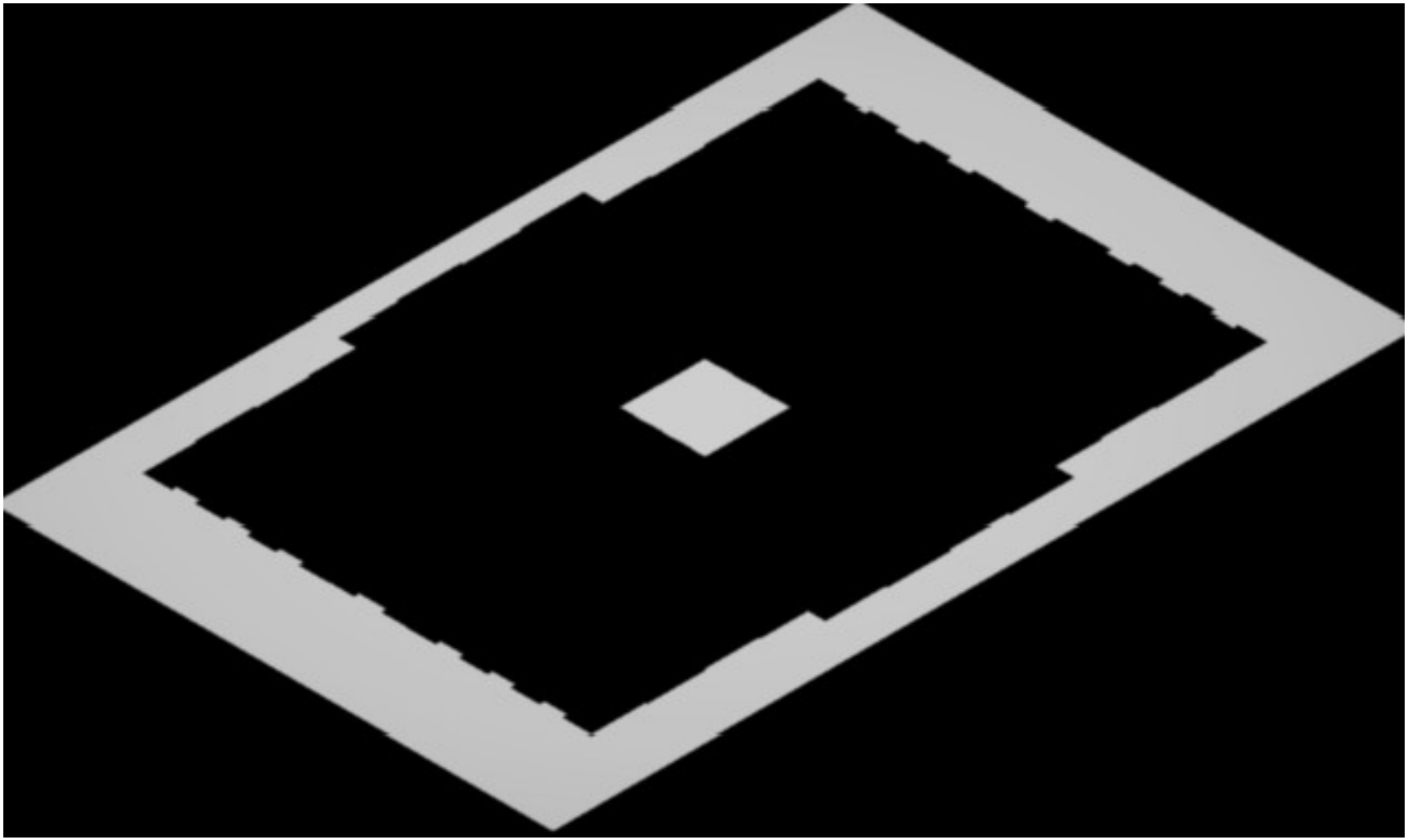


Coverage continuity, check with light source at 10m from the wall

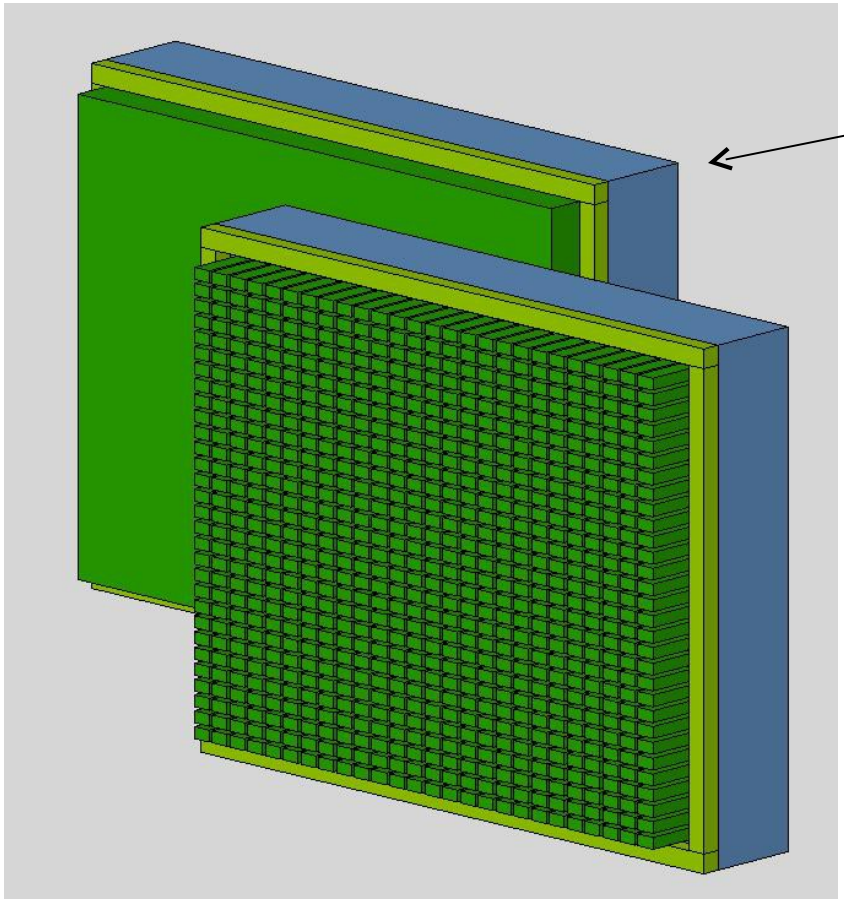


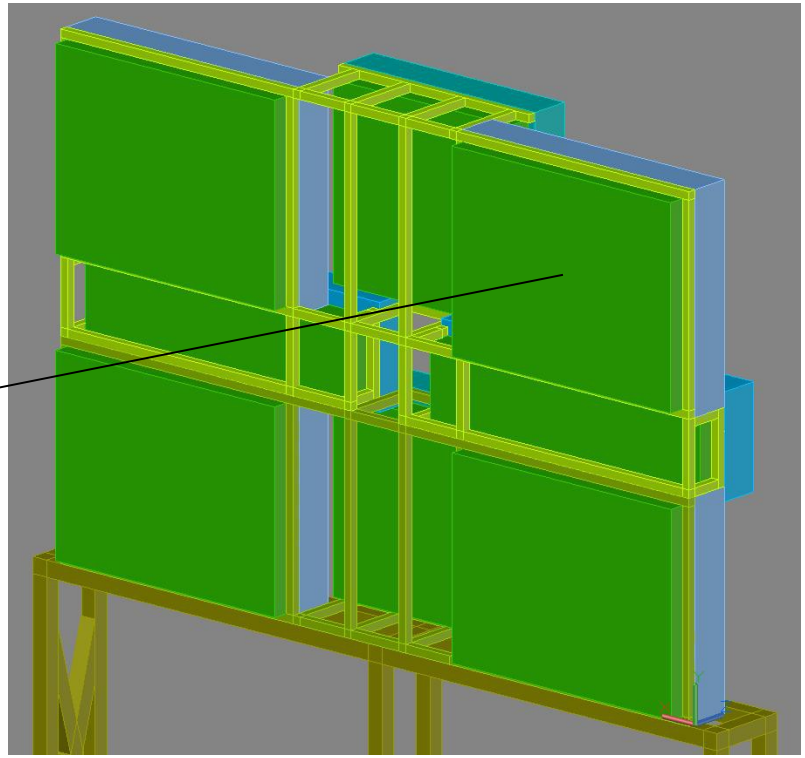


The shadow without holes (properly coverage)

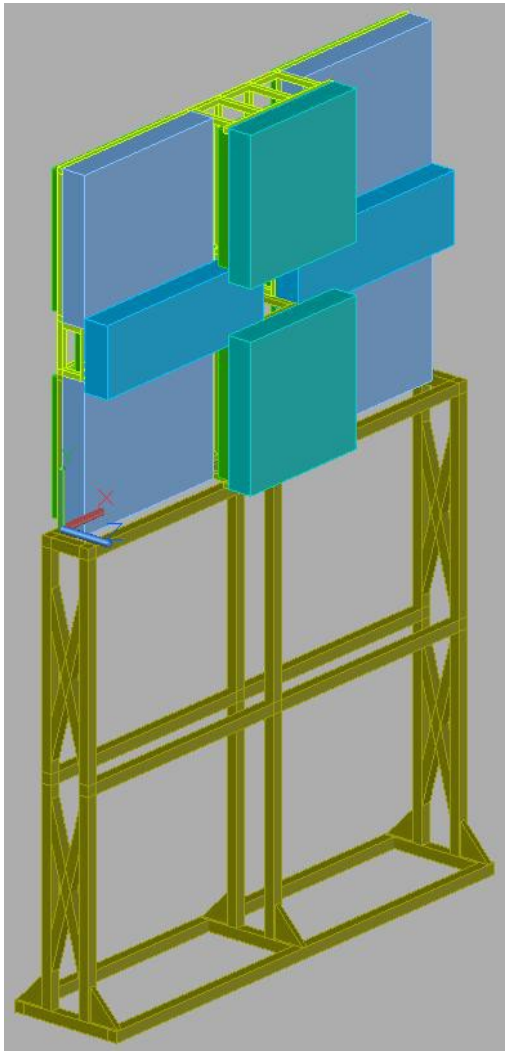


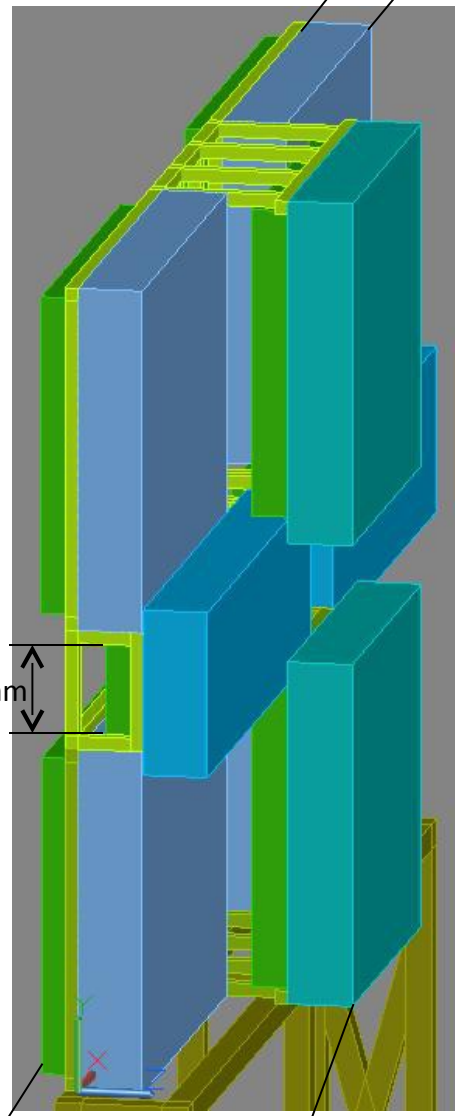
For super modules positioning should be taken into consideration the size of the electronics

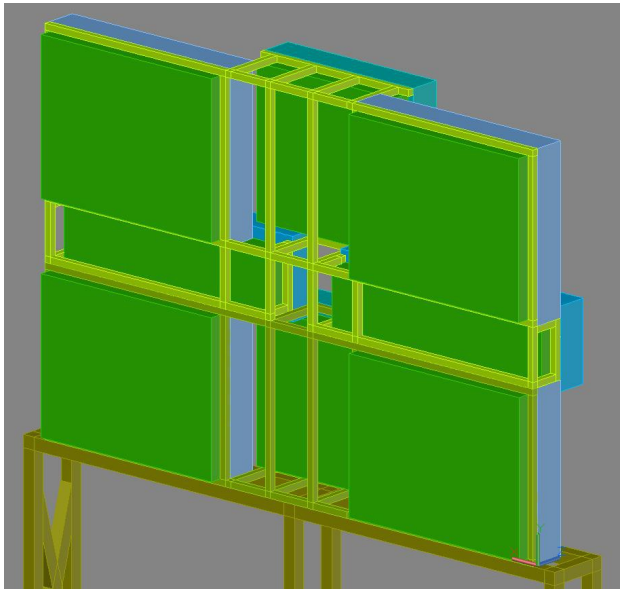




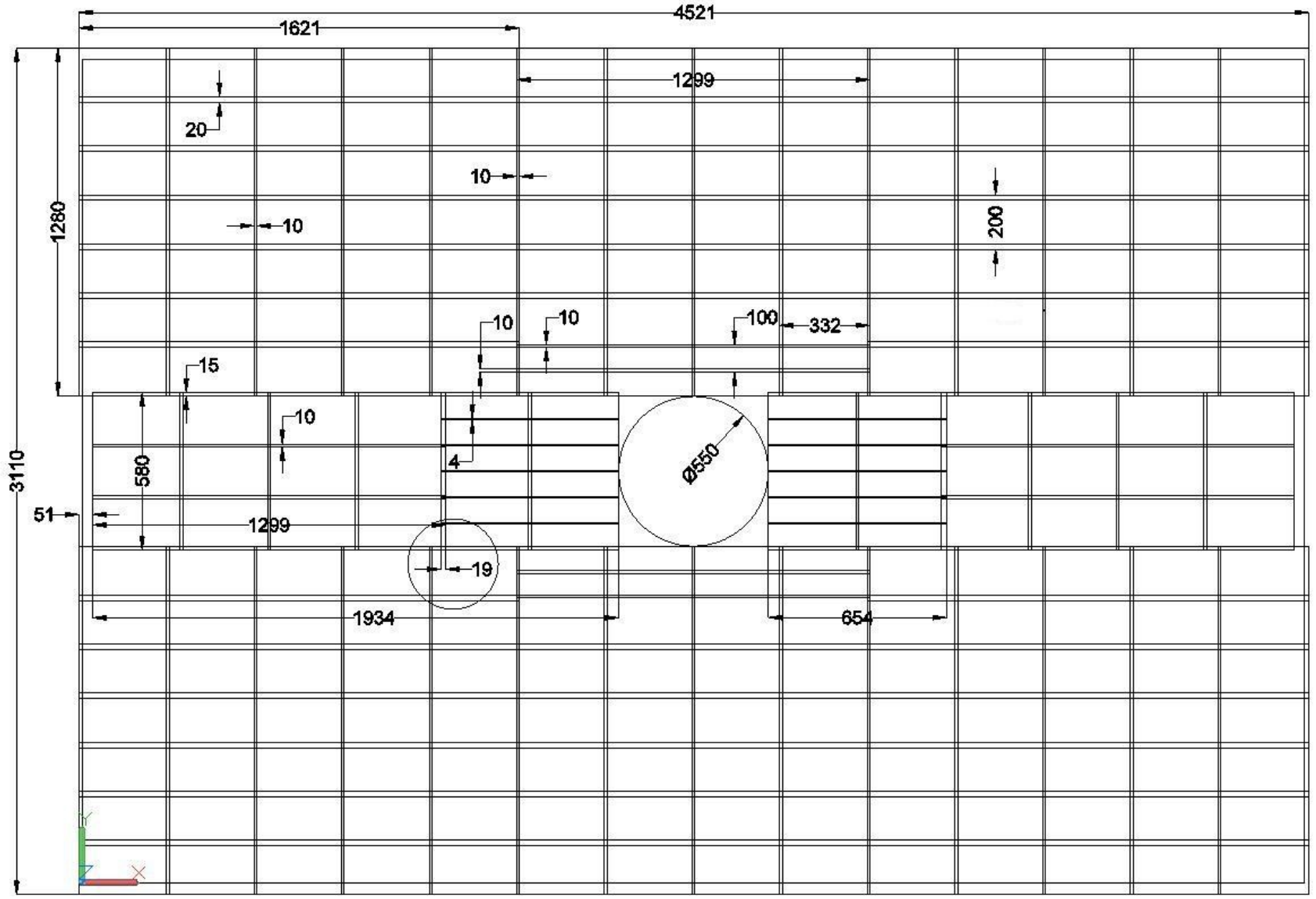
Super modules positioning without extraspace for electronics



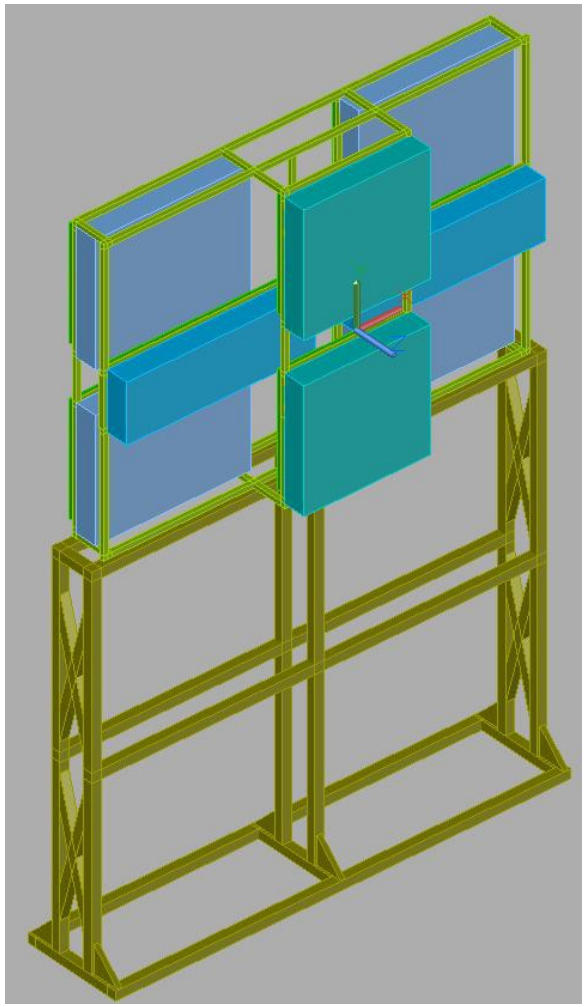


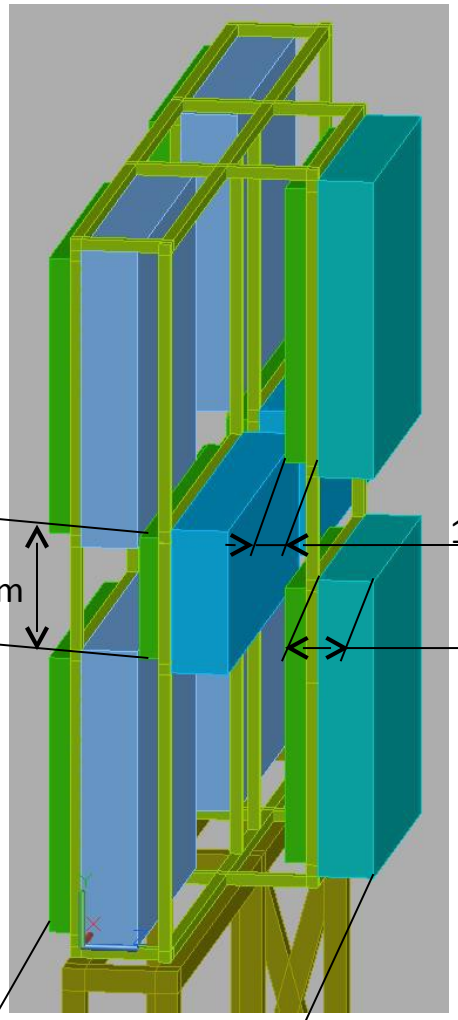


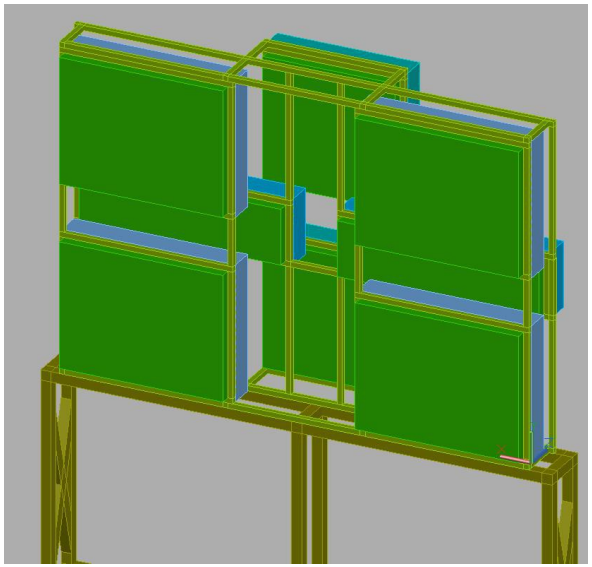
The required size of the overlap for version without space for electronics



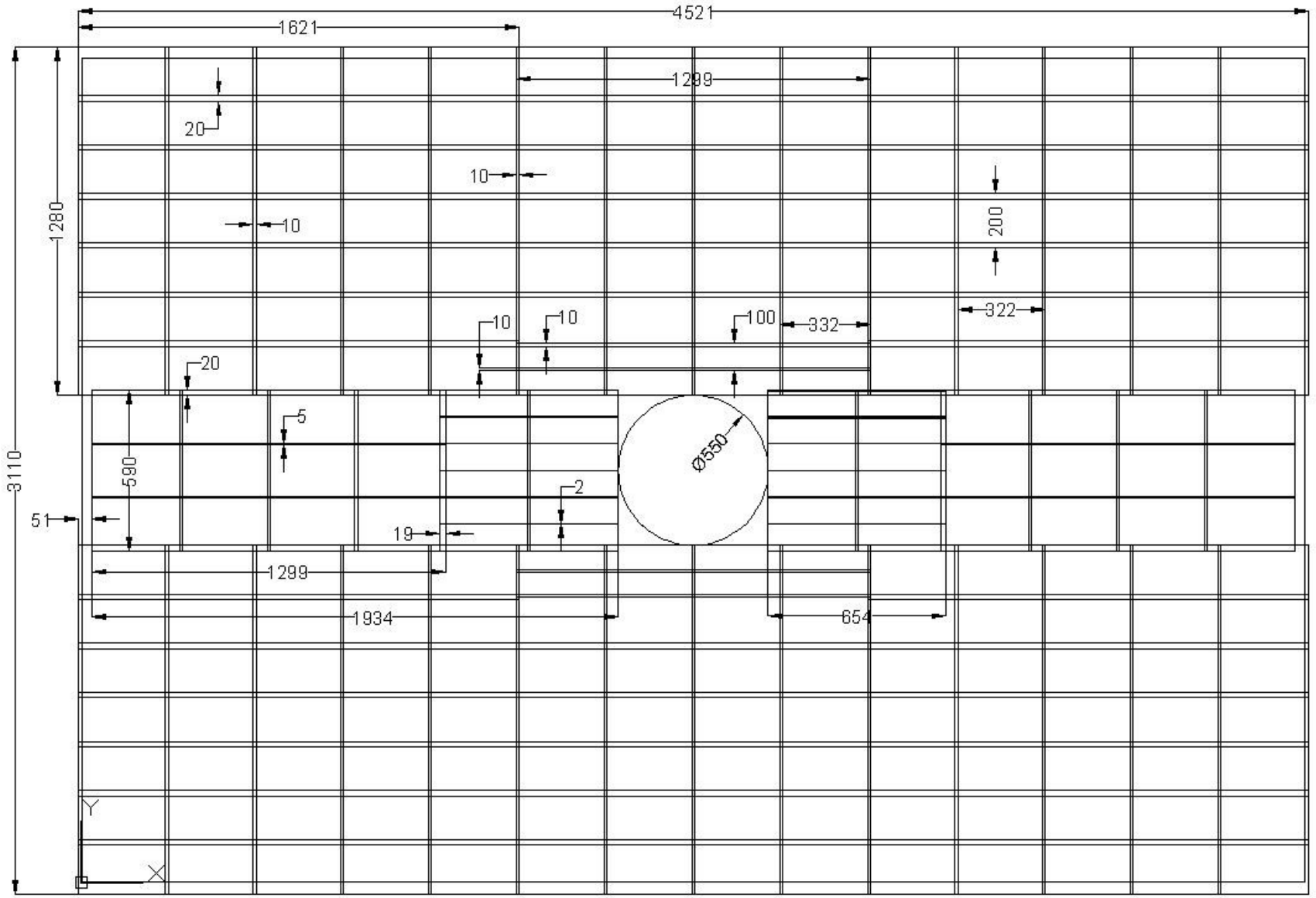
Super modules positioning with extraspace for electronics







The required size of the overlap for version with space for electronics



Inner zone by numbers

First version for super modules positioning (without extraspace for electronics)

No. of cells: 350x200	212
No. of cells: 350x100	40
Total cells	252
No. of strips / cell	80
No. of signals	40320

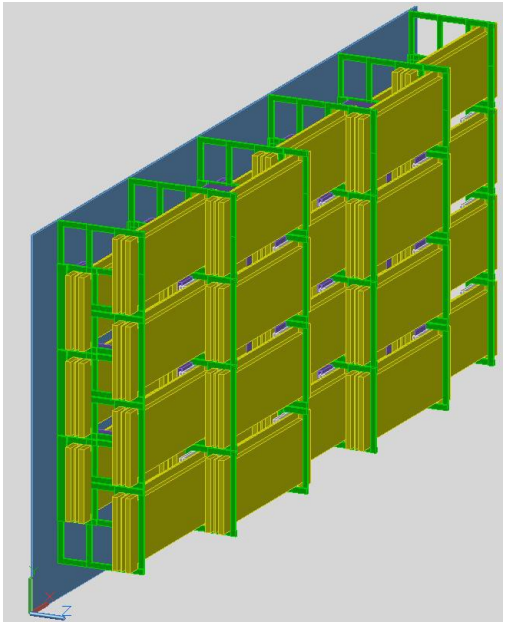
Wall area (A1)	13.70 m^2
Total cells area (A2)	15.41 m^2
Overlap on Y	1.28 m^2
Overlap on X	0.40 m^2
Total overlap	1.68 m^2
Overlap percentage for A1	12.30 %
Overlap percentage for A2	10.93 %

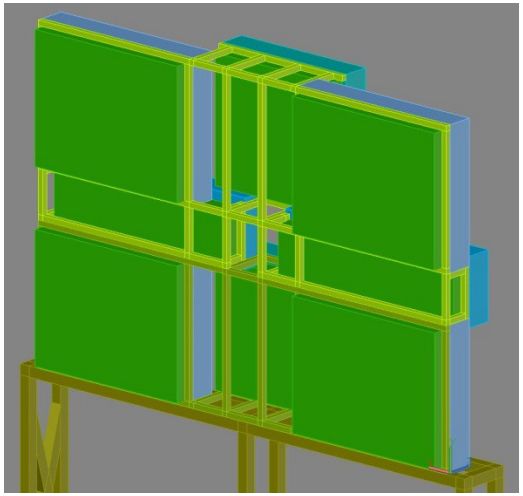
Second version for super modules positioning (with extraspace for electronics)

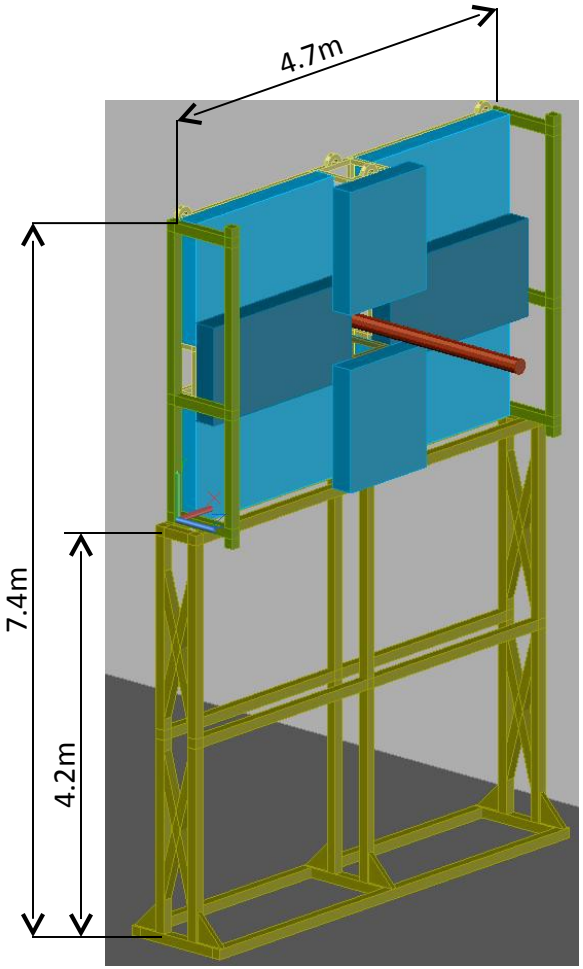
No. of cells: 350x200	212
No. of cells: 350x100	40
Total cells	252
No. of strips / cells	80
No. of signals	40320

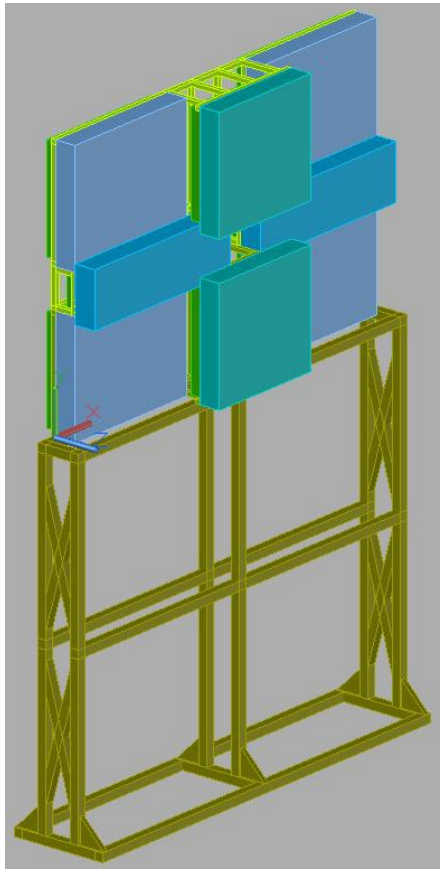
Wall area (A1)	13.70 m^2
Total cells area (A2)	15.41 m^2
Overlap on Y	1.28 m^2
Overlap on X	0.40 m^2
Total overlap	1.68 m^2
Overlap percentage for A1	12.31 %
Overlap percentage for A2	10.94 %

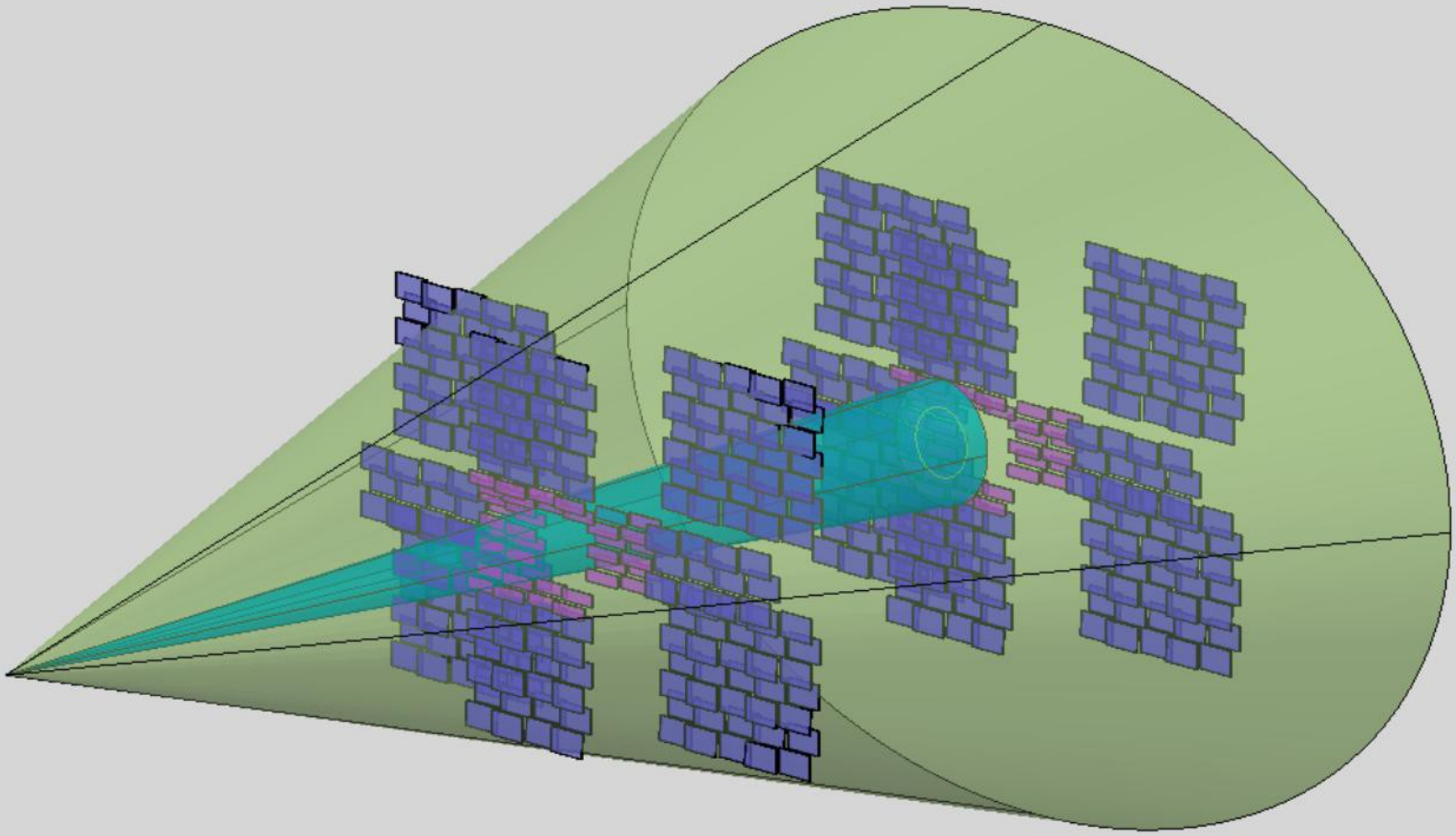
Proposal for the mechanical support











Thank you!