

Cathode design

Adamo Gendotti

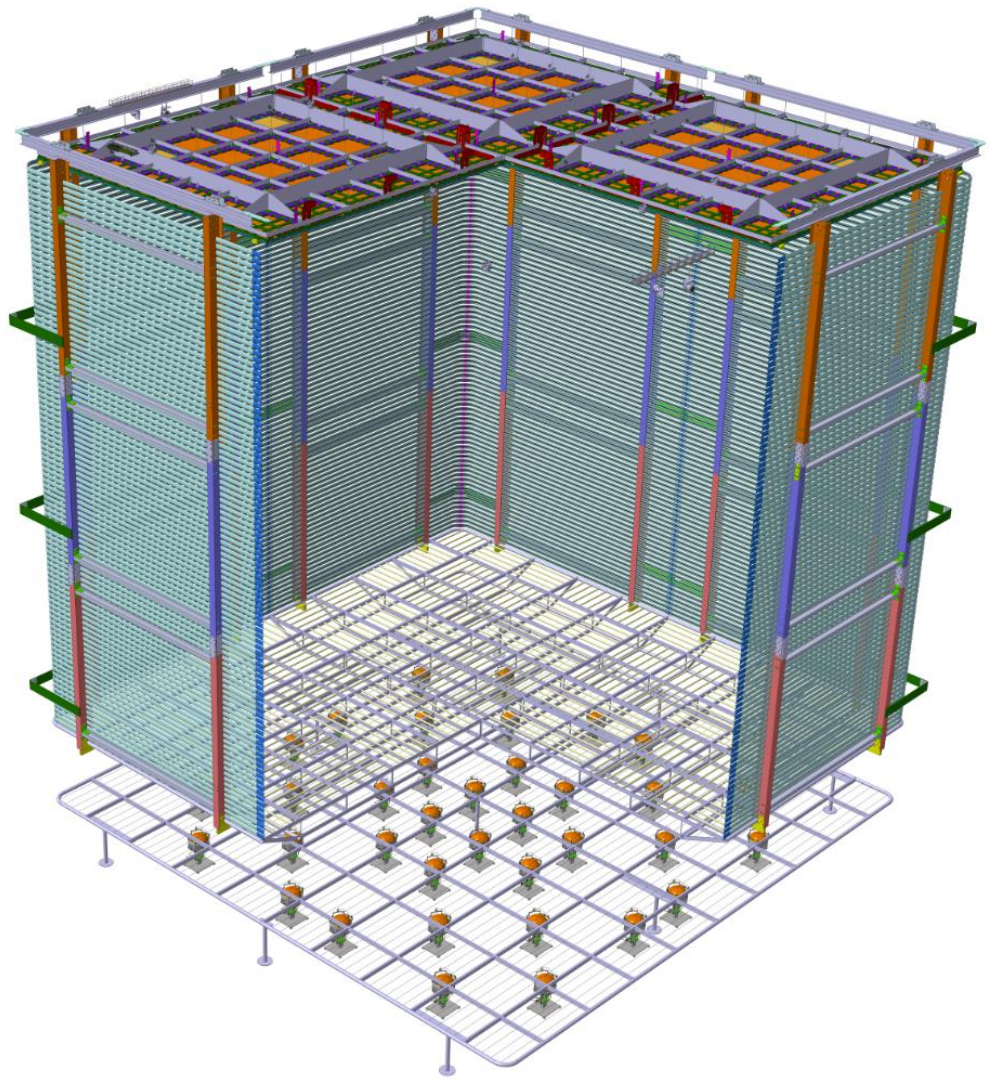
ETH zürich

25.04.2017

Cathode design:

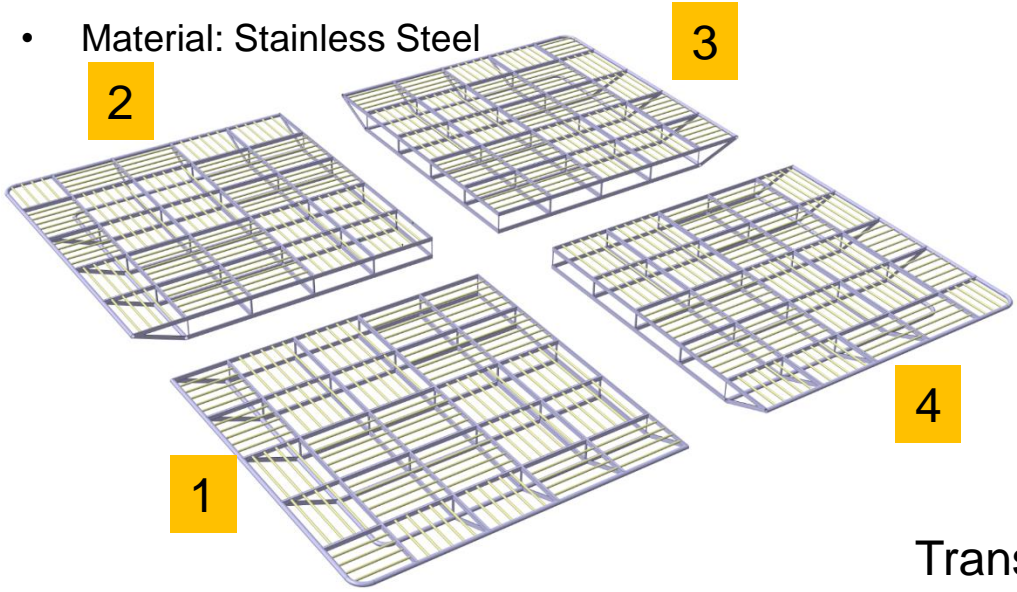
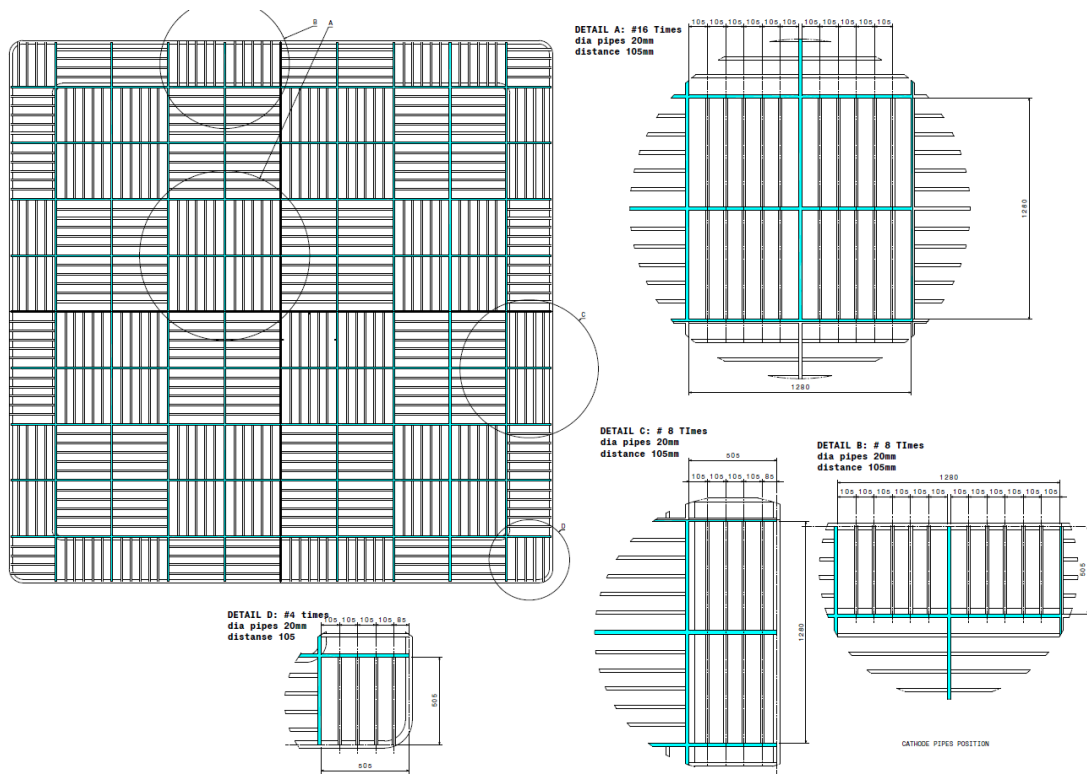
- Overview
- Modules
- PCB Board Voltage divider connection
- HV Degrader Connection
- Ground Grid

- Cathode is a Stainless Steel structure of 6mx6m
- Connected at the bottom of the Drift Cage
- Mechanical connection points are at the external perimeter
- Structure is self-supporting
- Entire Cathode will be at 300KV



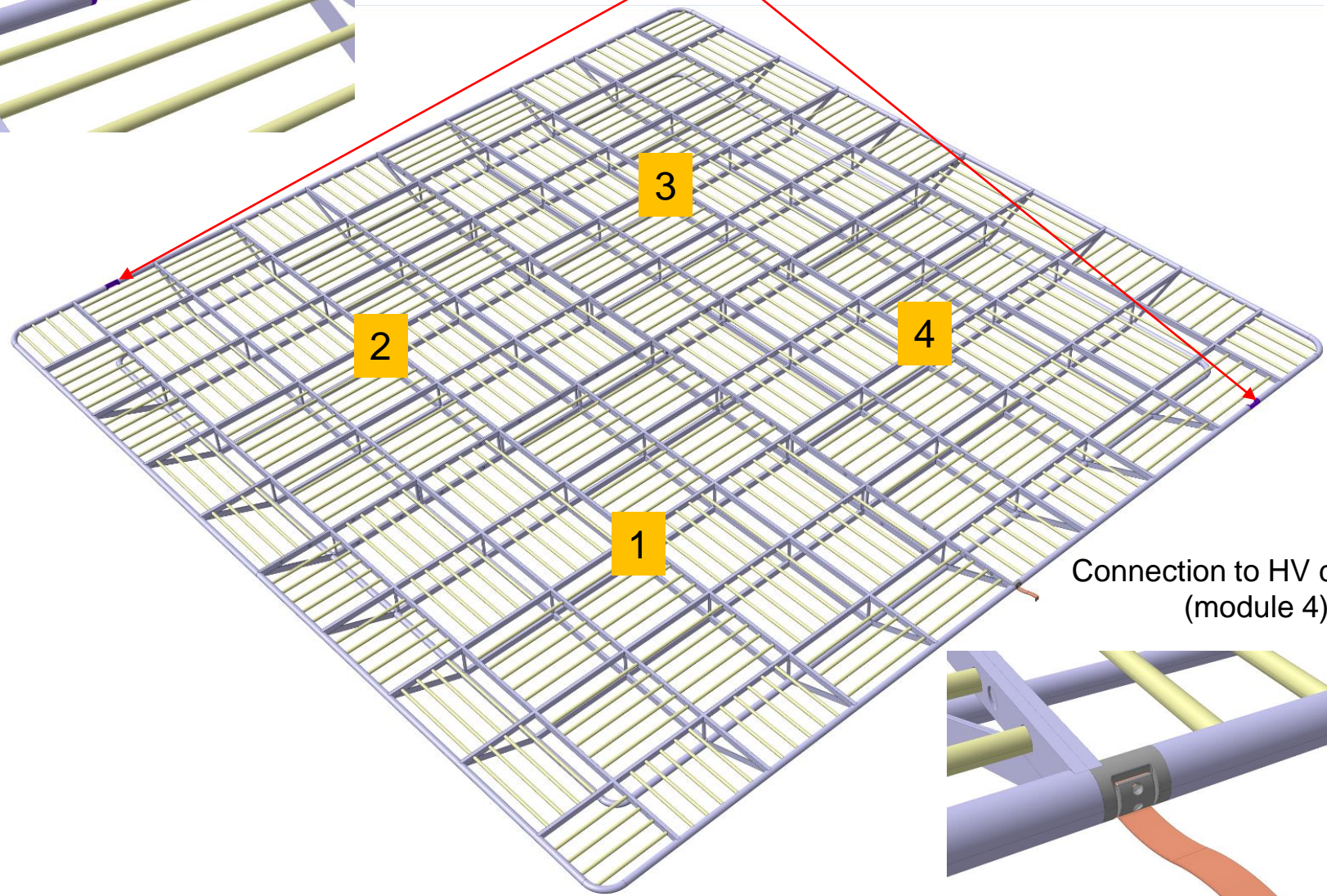
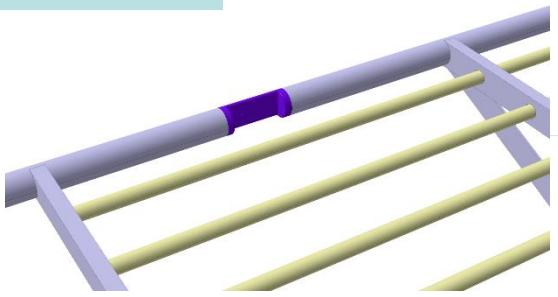
Overview

- 4 identical Modules bolted together
- Mechanical Structure consists in:
 - External Round Pipe of 40mm Dia
 - Internal Rectangular pipes 20x40x2mm (with round edges)
- Grid consist in 20 mm dia SS pipes with 105mm pitch
- Crossed pipes orientation
- Material: Stainless Steel

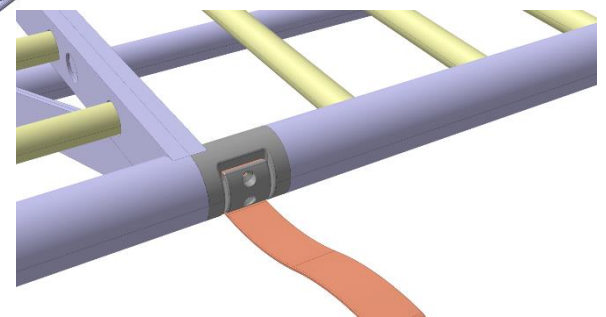


Transportation BOX Size: 3.2m x 3.2m x 0.5m

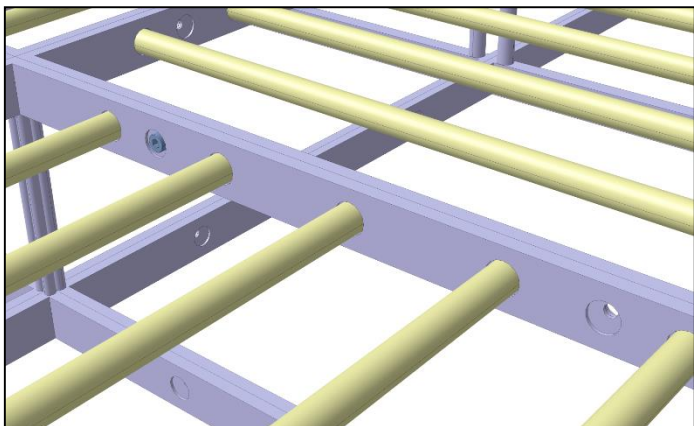
Connection to PCB Board HV divider
(modules) 2 and 4



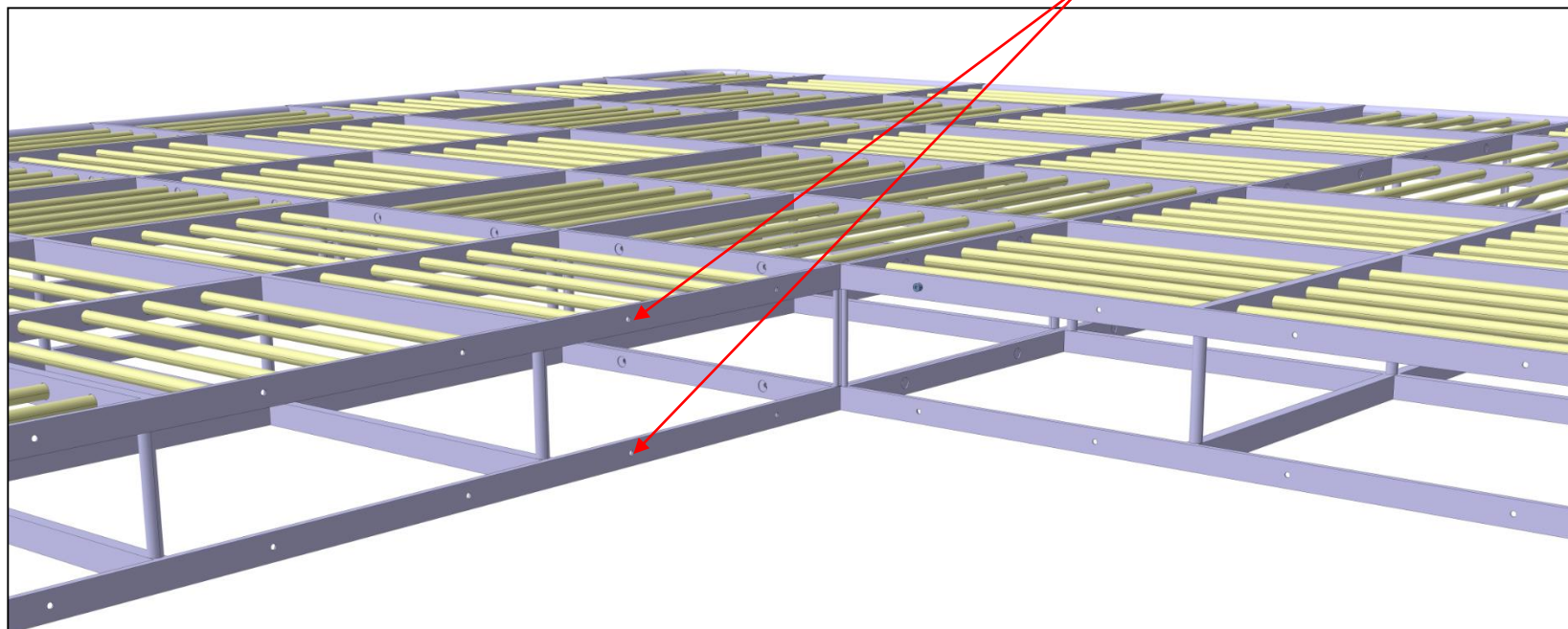
Connection to HV degrader
(module 4)



- Connection between modules is with M8 Screws and Nuts



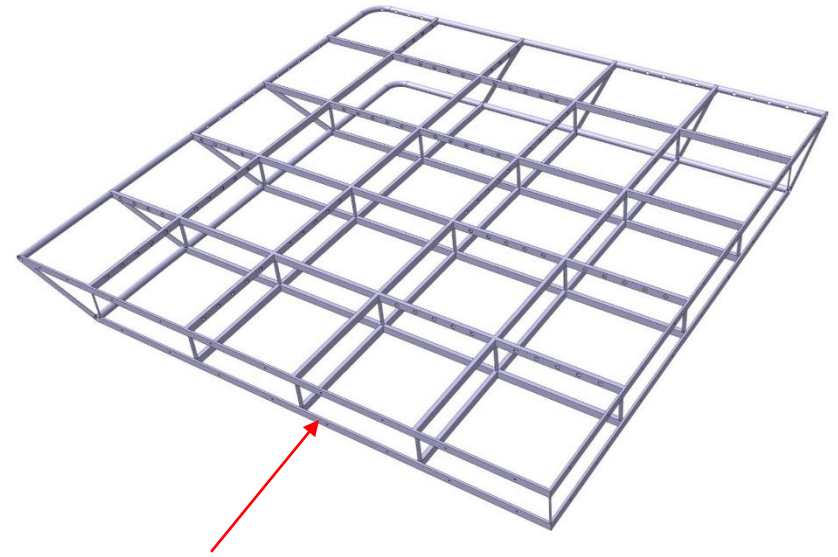
- Connection every ~300mm at top and bottom structure



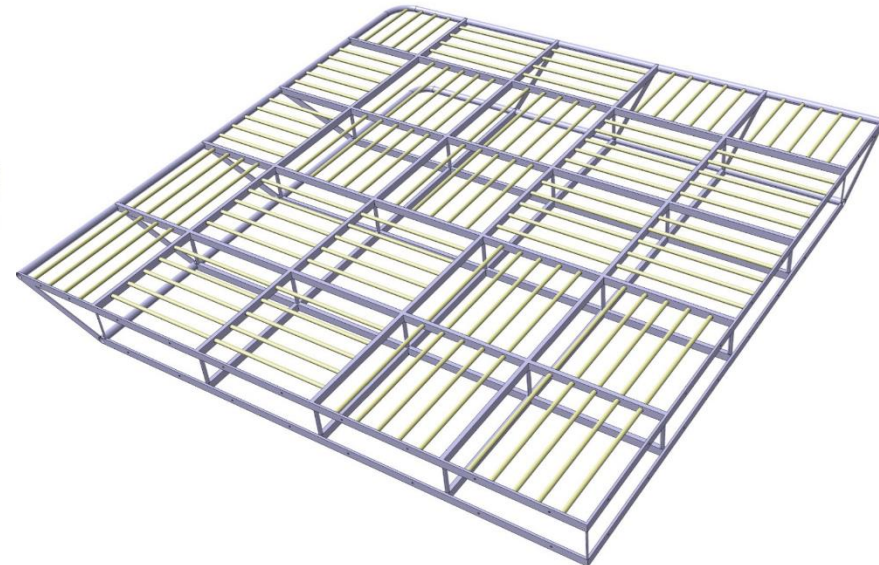
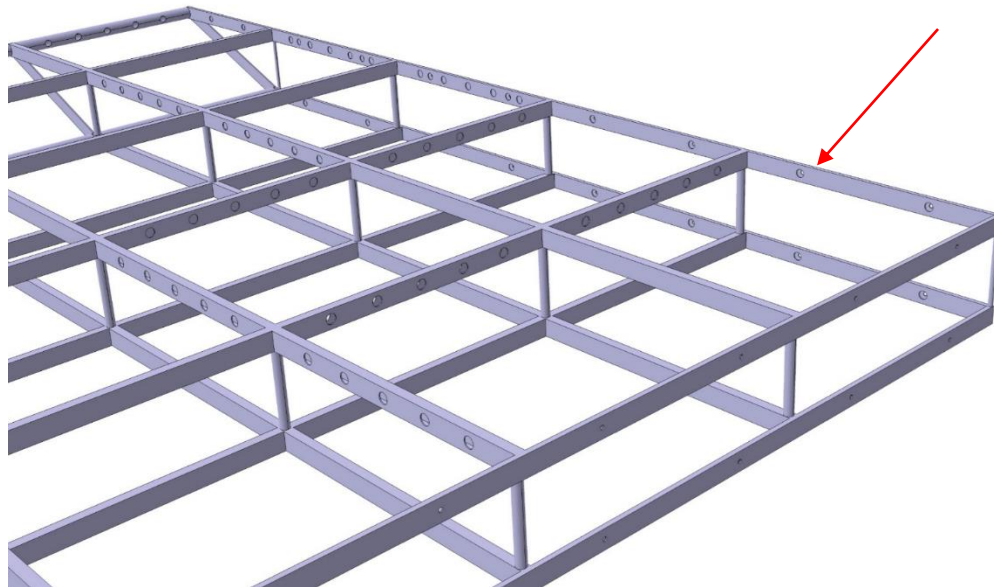
- Module is 3.135 x 3.135 x 0.24 m
- Holes everywhere in the profiles to allow Lar to go through (avoid stuck bubbles)

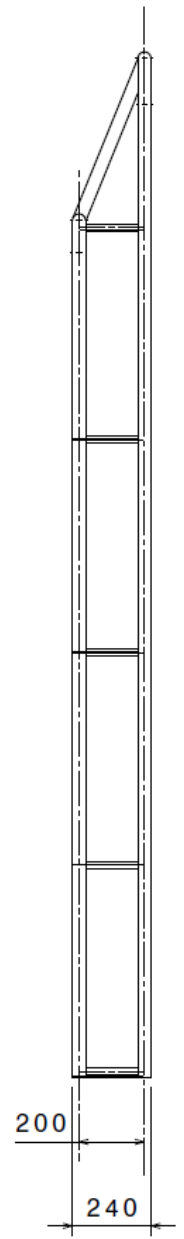
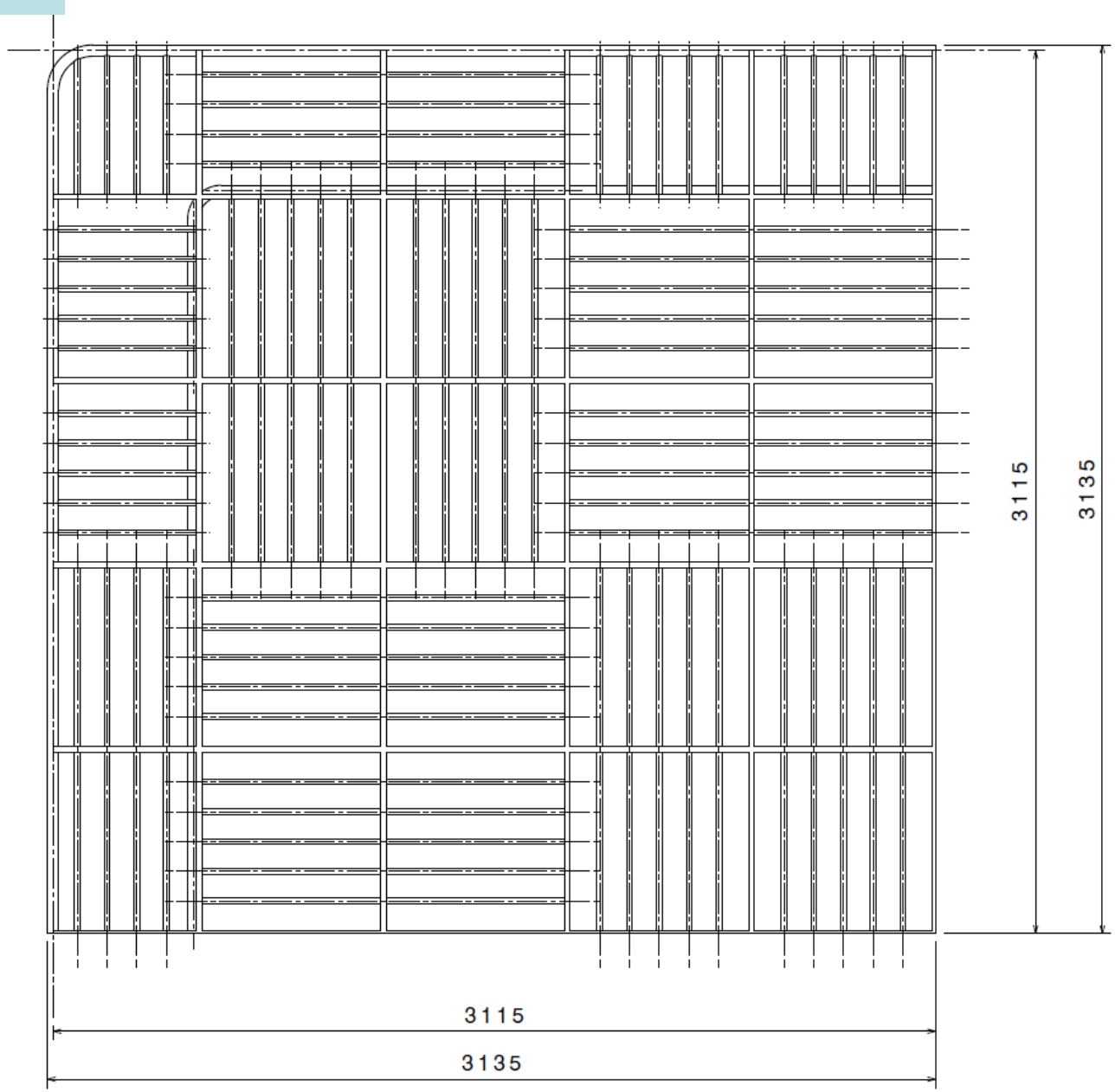
- Cathode Module: 136 Kg
- Pipe Grid 35 Kg

Module weight 171 Kg x 4 Modules = 684 Kg



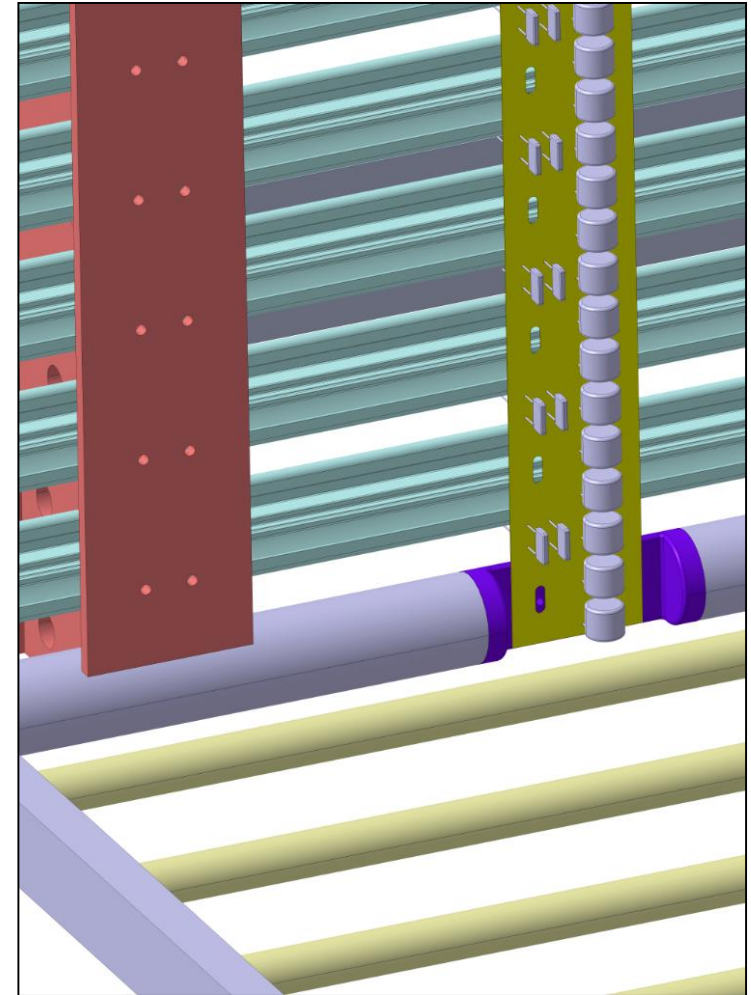
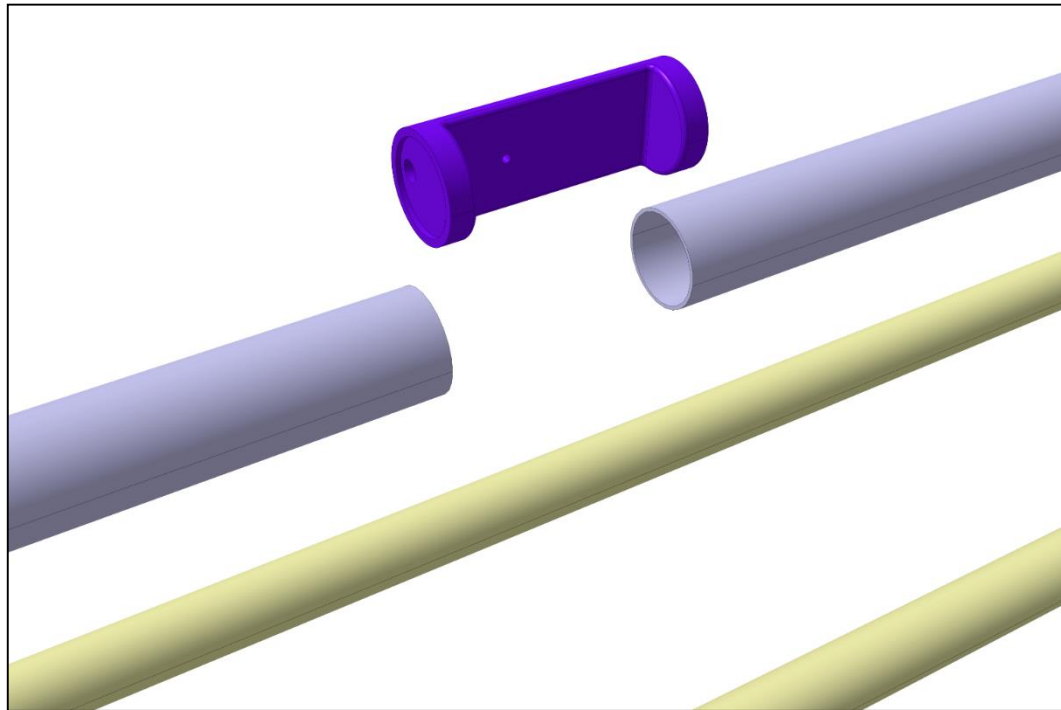
Bolt Connection to the others modules



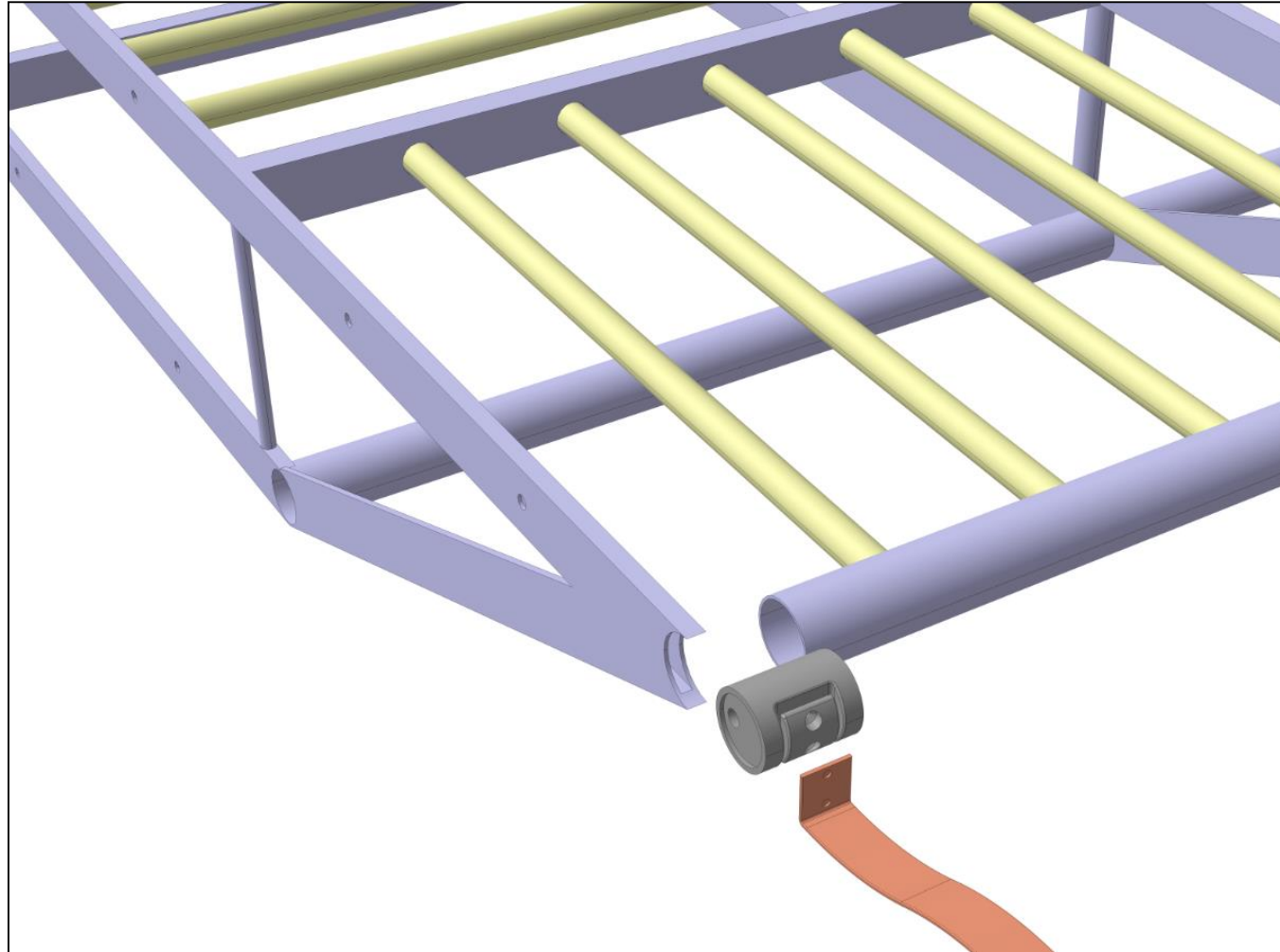


PCB Board Voltage divider connection

- 2 modules have special connection for the PCB Board
- Full rod (dia 40mm) insert of 100mm length machined in order to accomodate the PCB Board

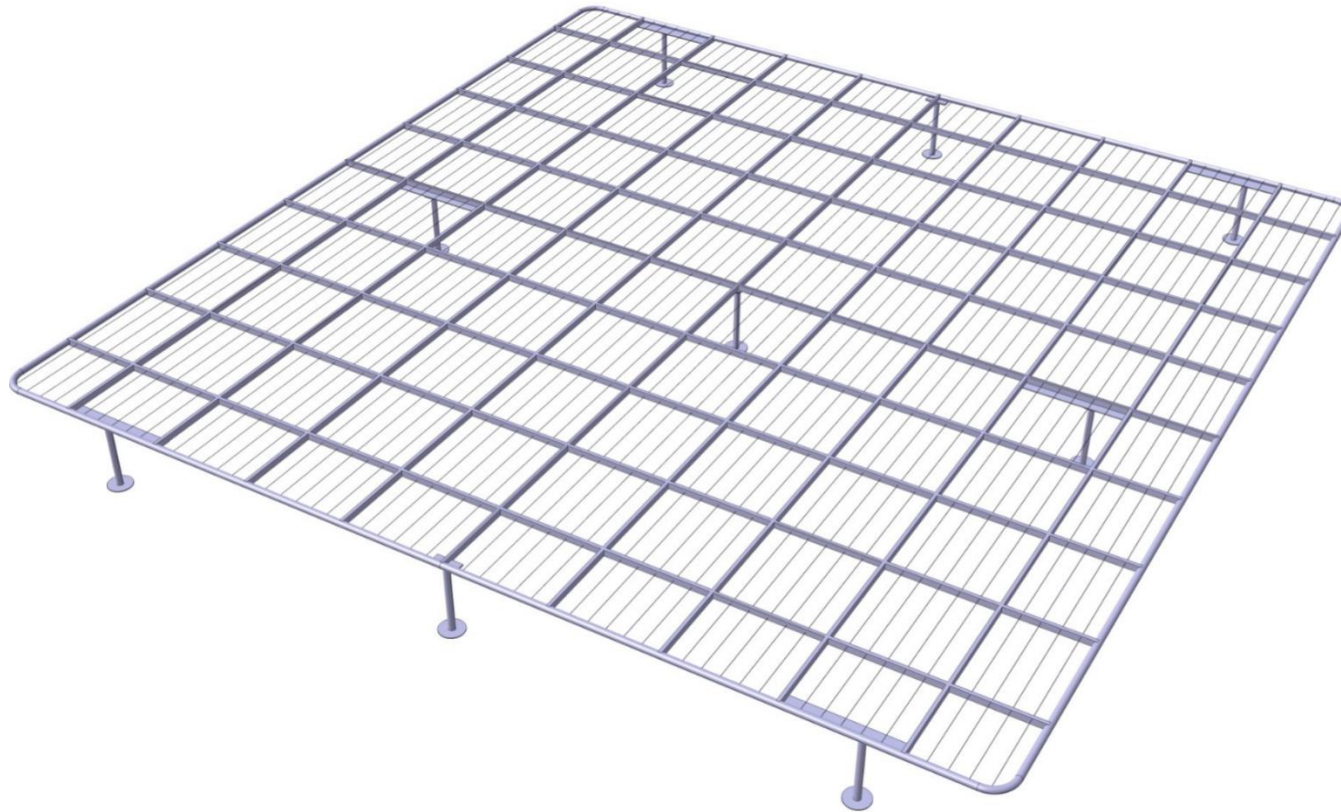
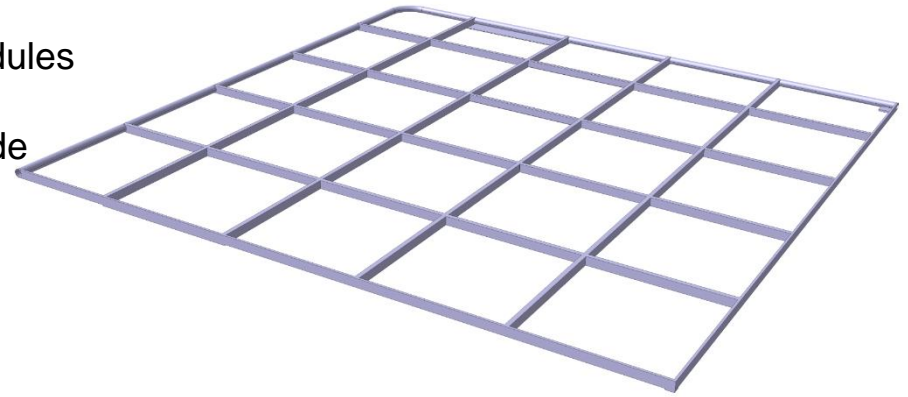


- 1 Module have a special connection for the HV degrader
- Full rod (dia 40mm) insert with «cap» of 50mm length machined for cable fixing



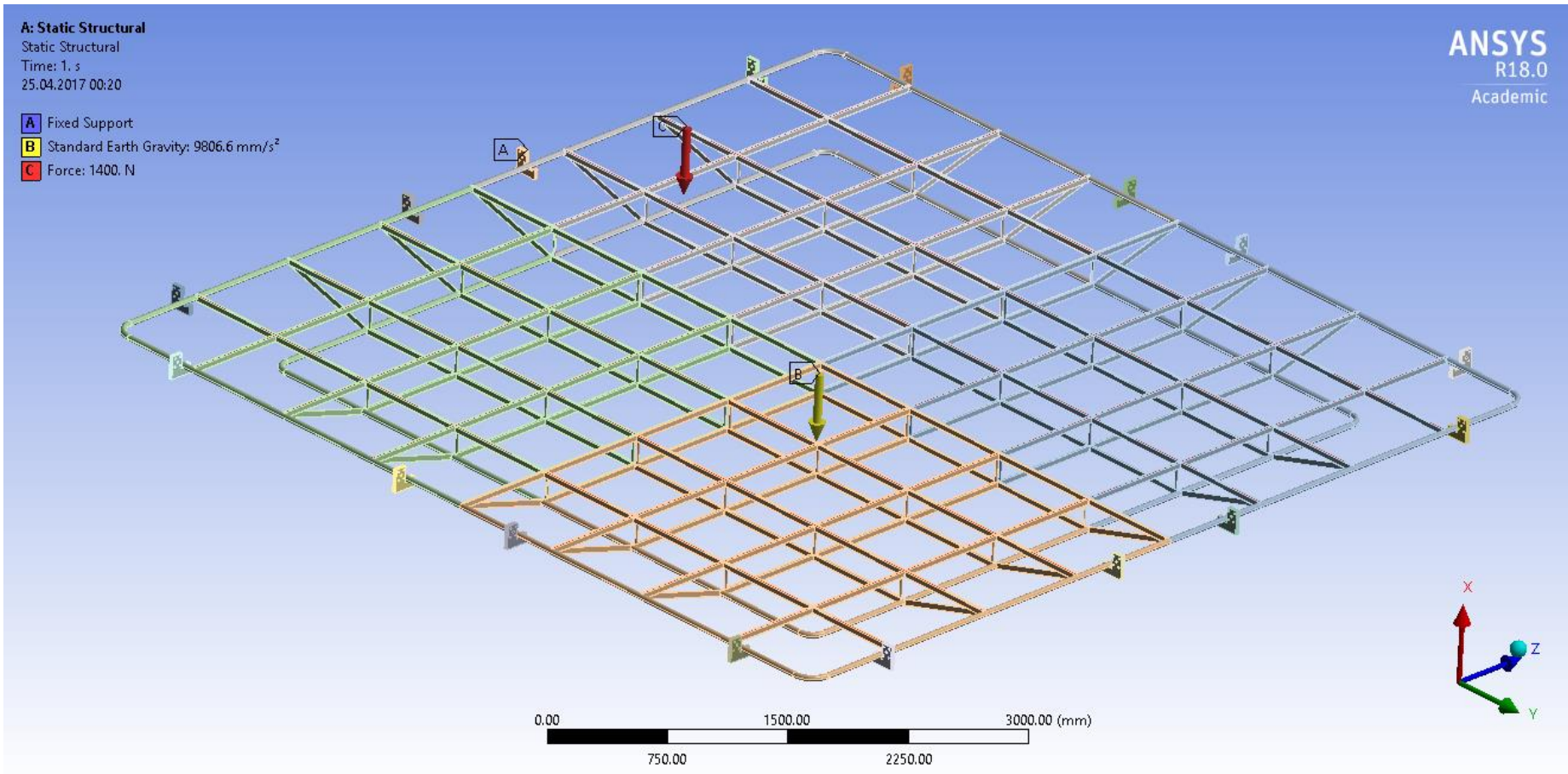
Ground Grid

- Same as for the Cathode it consists in 4 identical modules
- Geometry exactly the same as the Top of the Cathode
- No self-supporting structure
- Pillars sitting on the membrane
- No pipe grid but 4mm dia stainless steel wires will be used → 6 m long

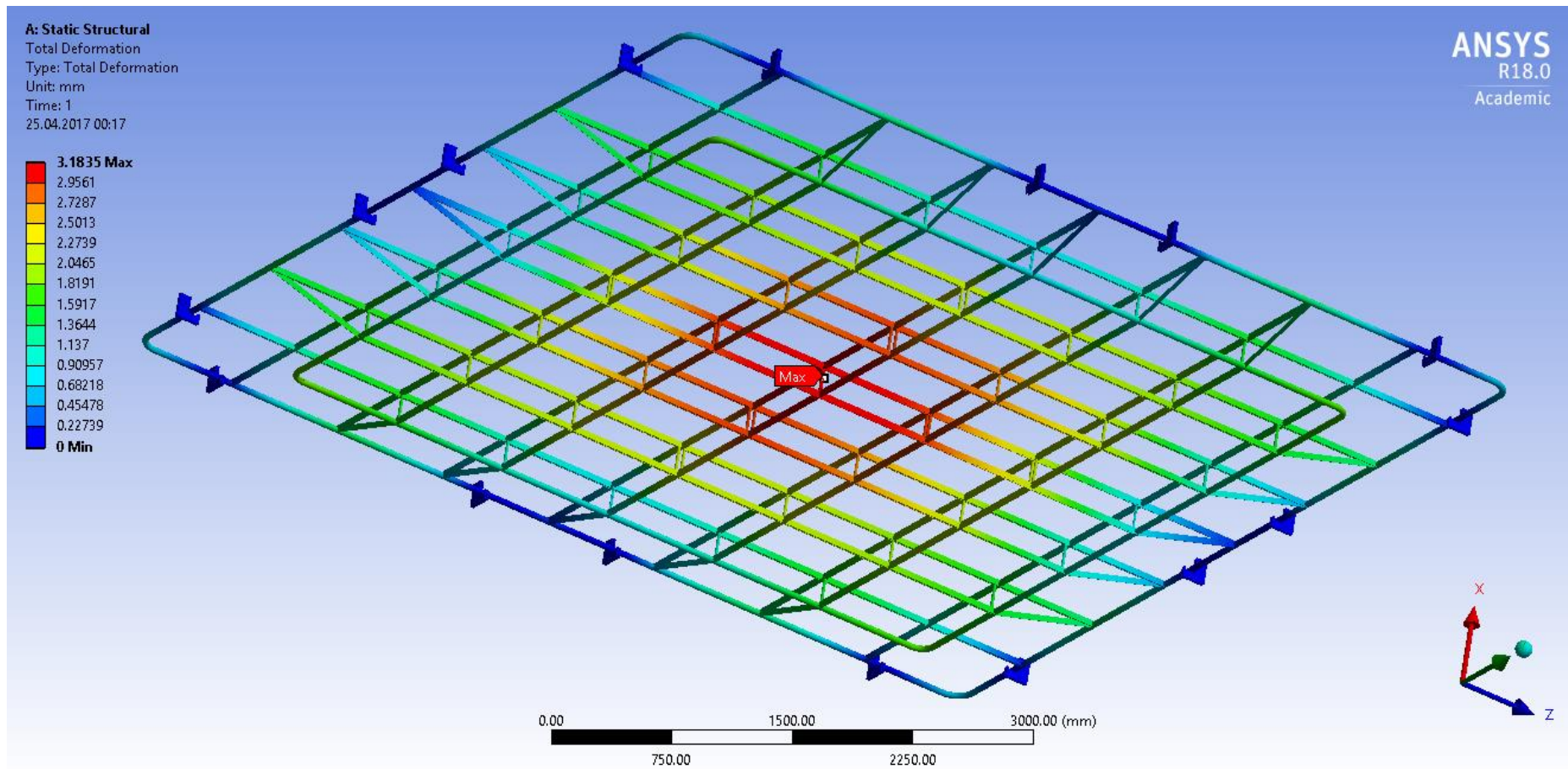


Thank you

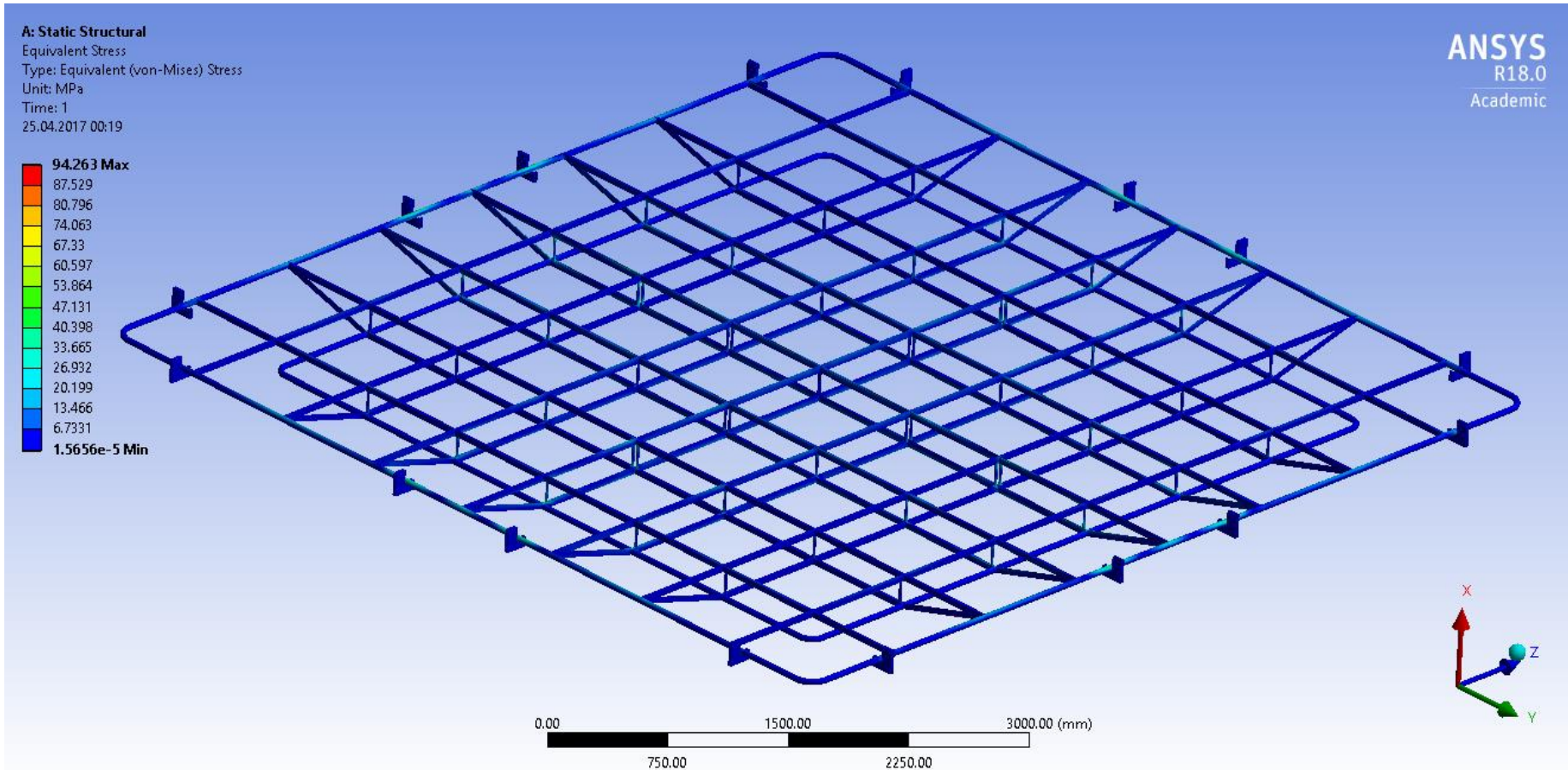
CATHODE - PRELIMINARY STRUCTURAL ANALYSIS



Deformation



Equivalent Stress



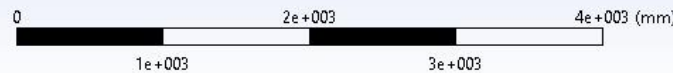
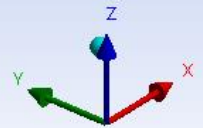
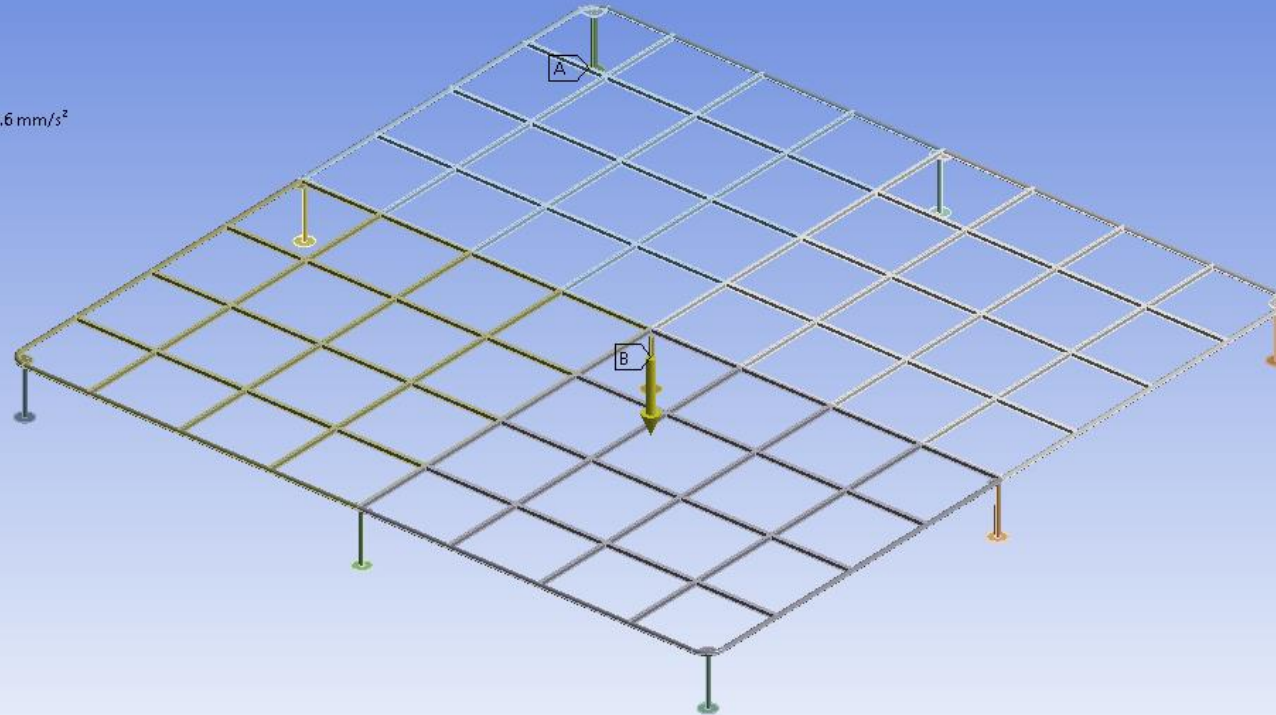
GROUNDGRID - PRELIMINARY STRUCTURAL ANALYSIS

A: Static Structural

Static Structural
Time: 1. s
25.04.2017 00:53

- A** Fixed Support
- B** Standard Earth Gravity: 9806.6 mm/s²

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GROUNDGRID - PRELIMINARY STRUCTURAL ANALYSIS

A: Static Structural

Total Deformation

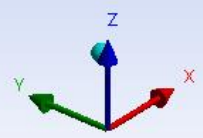
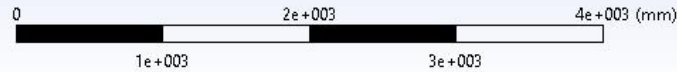
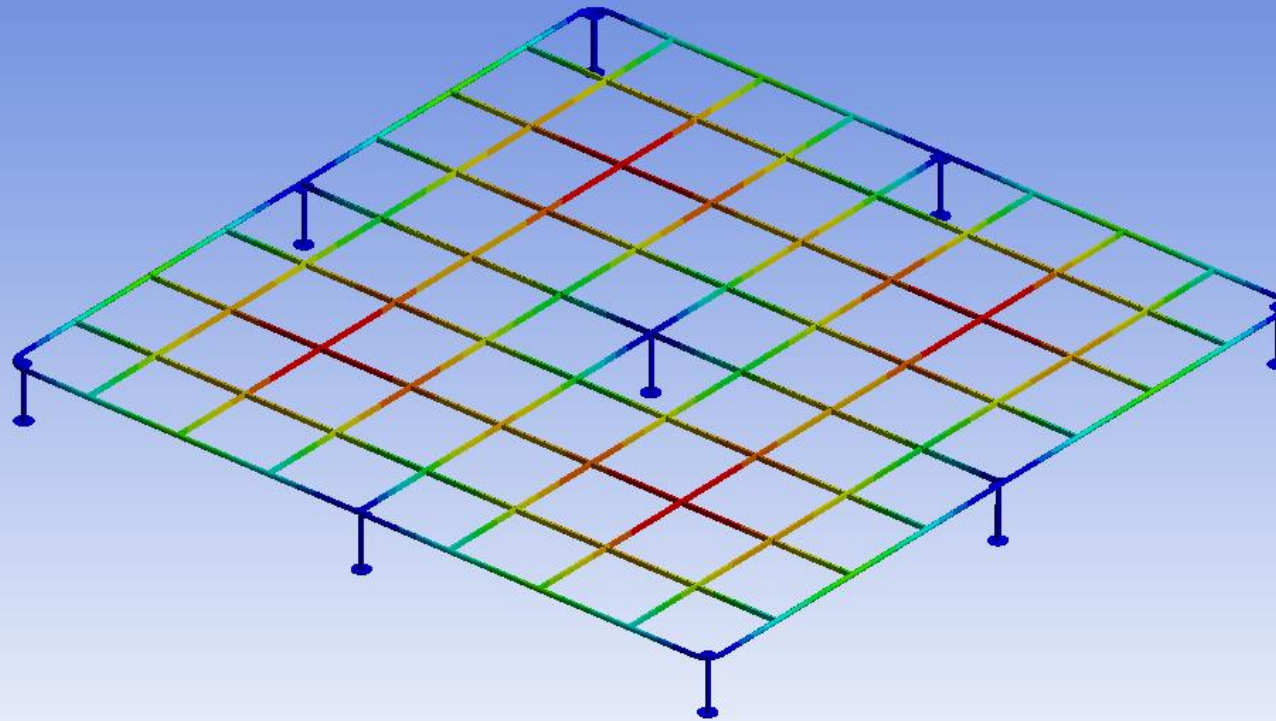
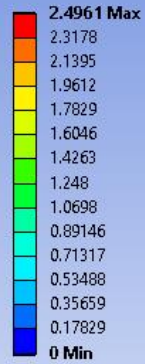
Type: Total Deformation

Unit: mm

Time: 1

25.04.2017 00:54

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GROUNDGRID - PRELIMINARY STRUCTURAL ANALYSIS

A: Static Structural

Equivalent Stress

Type: Equivalent (von-Mises) Stress

Unit: MPa

Time: 1

25.04.2017 00:46

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