

# Membrane PD Modules: *Ciemat* *proposal*

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on behalf of the Ciemat Neutrino group.

2023 Juin 26

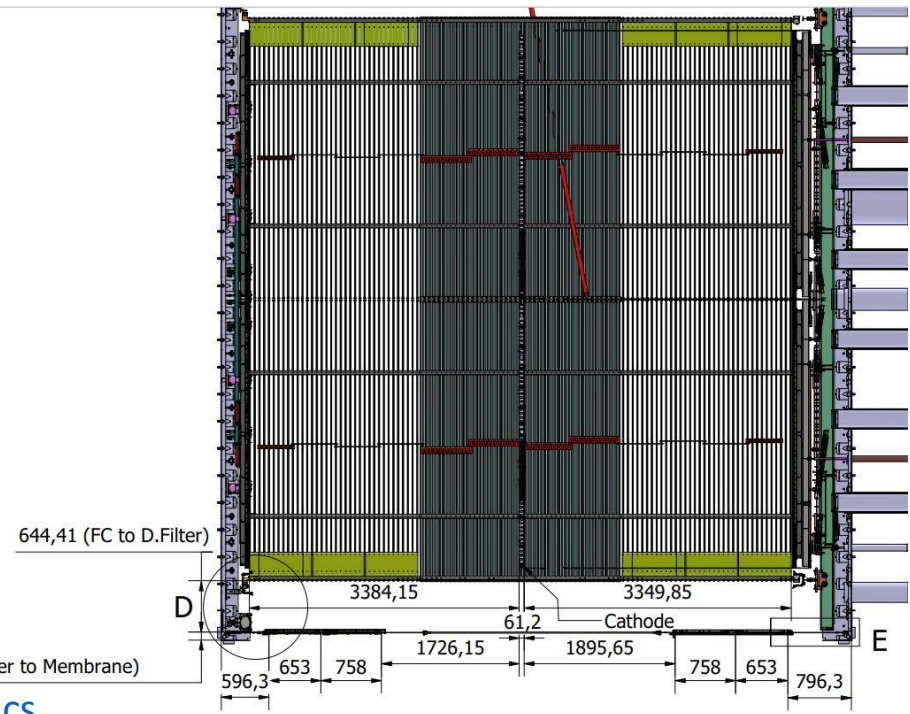
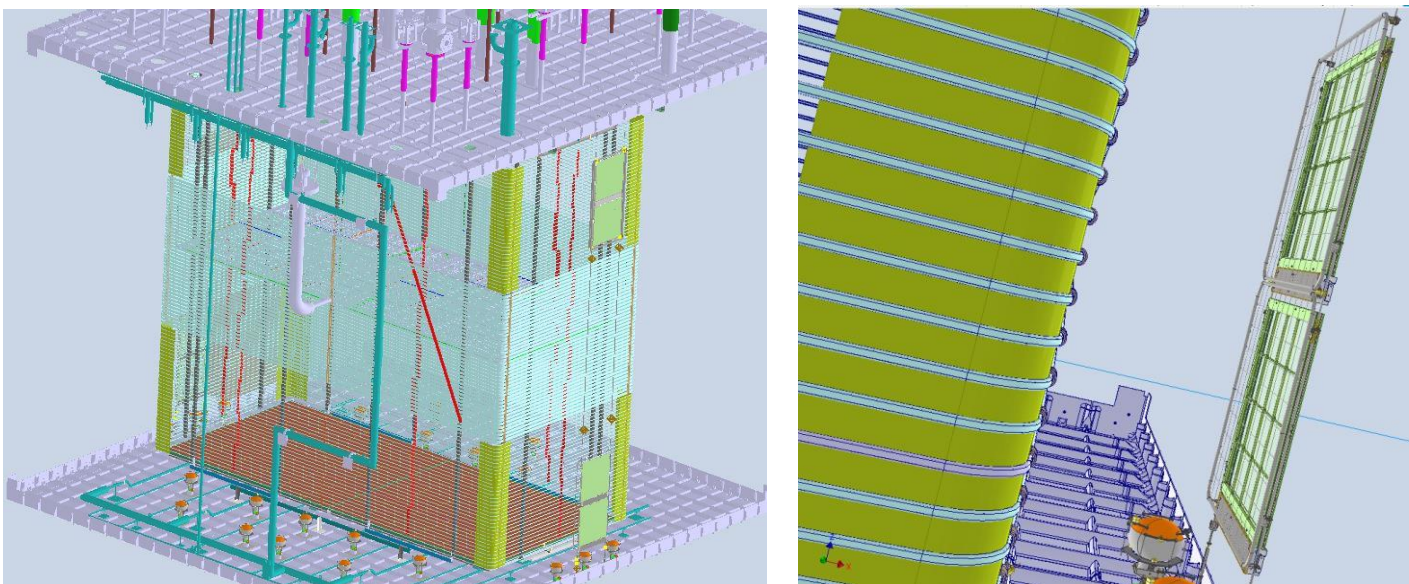
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- 5.-DUNE-FD2: Open question.

# 1.- ProtoDUNE-VD: Membrane PDm distribution.

Actual 3D & 2D drawing on EDMS:

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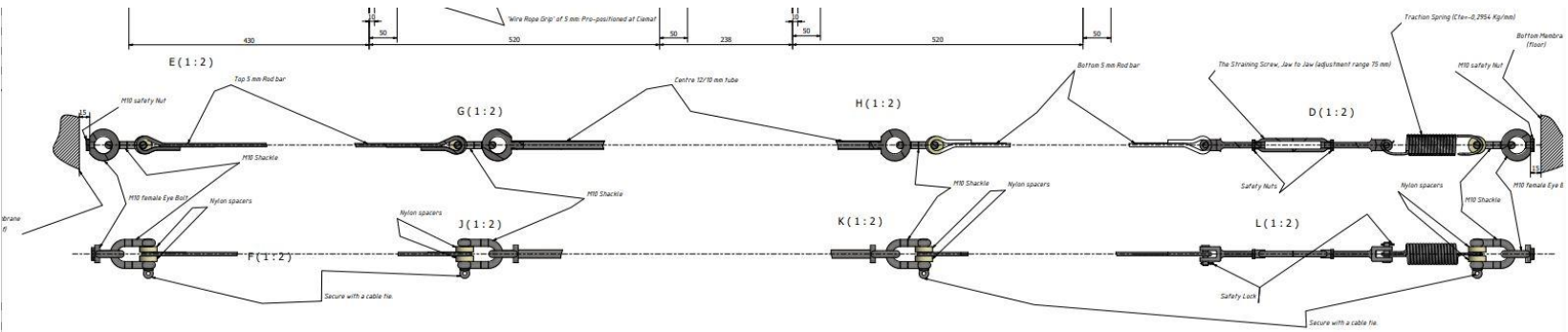
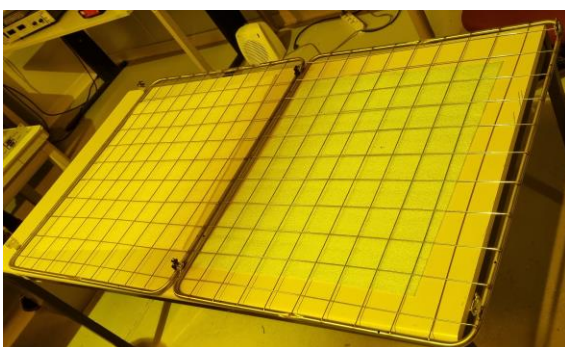


Actual Bottom membrane shielding on EDMS:

<https://edms.cern.ch/ui/#!/master/navigator/document?P:100704998:101262520:subDocs>

Actual membrane suspension system on EDMS:

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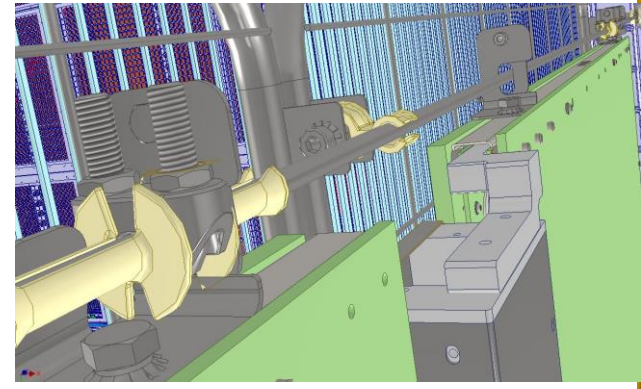
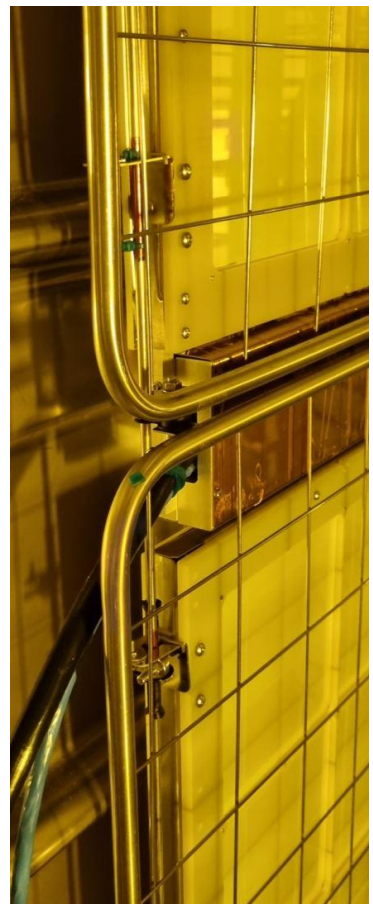
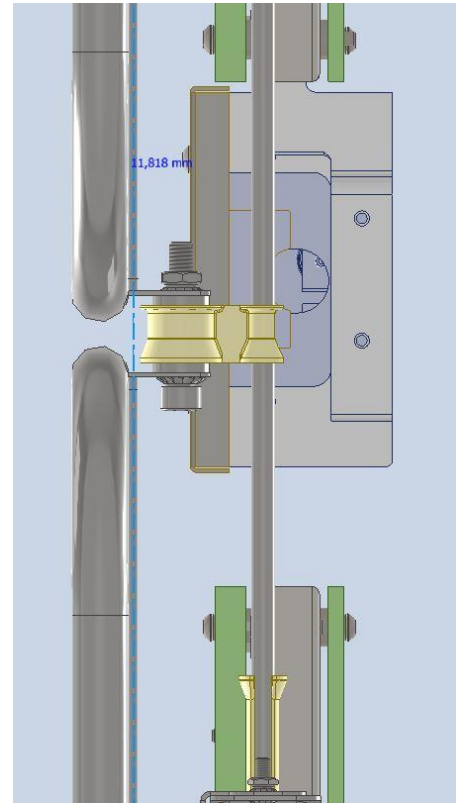
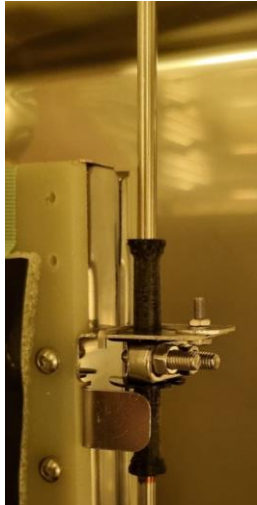


## 2.- ProtoDUNE-VD: Membrane PDm. Safety from FC & ground

ProtoDUNE, bottom membrane PDm not-TCO side, actual installed devices and safety from FC and ground:

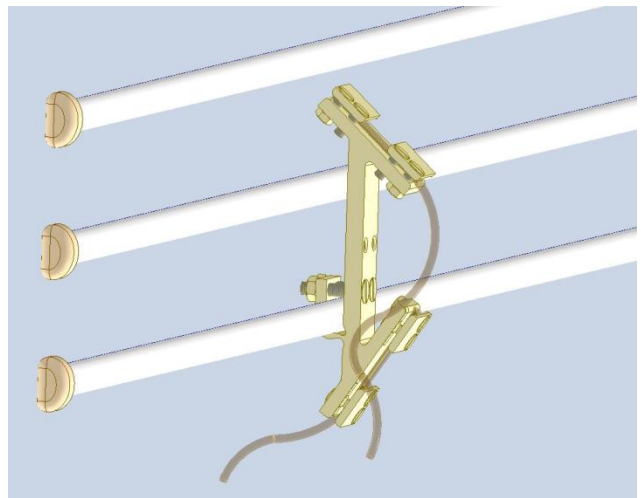
--PDm isolated from the membrane suspension system: Kapton & nylon pieces

--PDm isolated from the shielding system & membrane wall: Kapton & nylon pieces

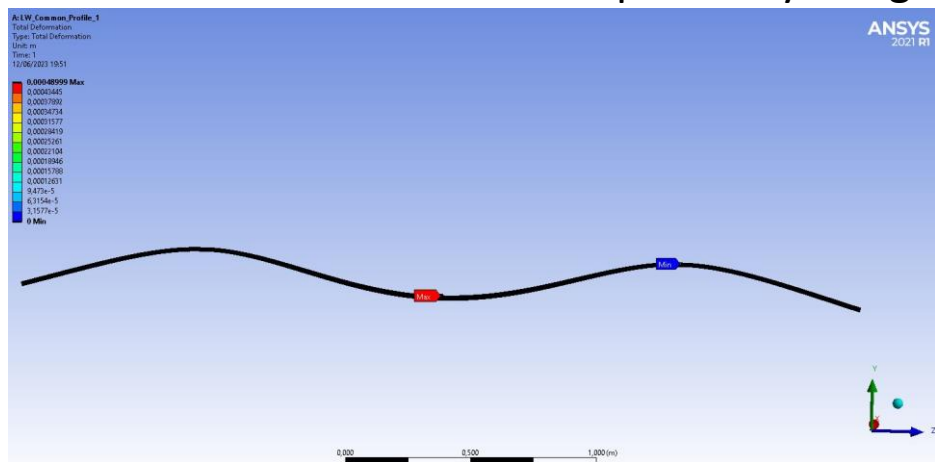


### 3.- ProtoDUNE-VD: Open question.

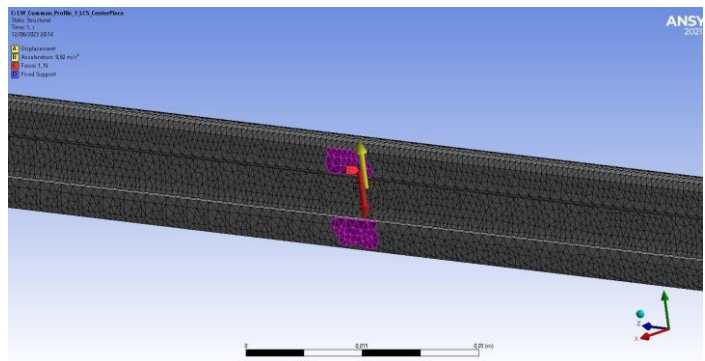
New proposal to fix the bottom Photon Detector Calibration system: Fixed on the last FC profile by nylon elements, including screws and nuts.  
 -Not metal devices on the design.  
 -weight about 65 grams, including OF at room temperature. But a cryogenic temperature will be reduced at only 10 grams... vertically up.



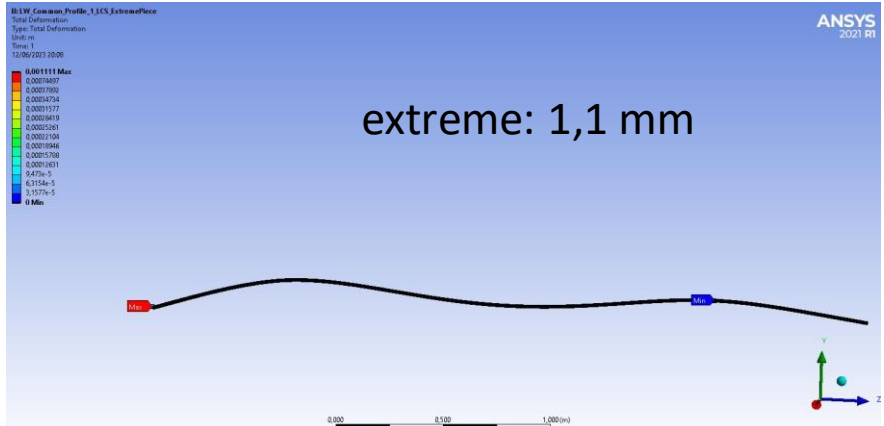
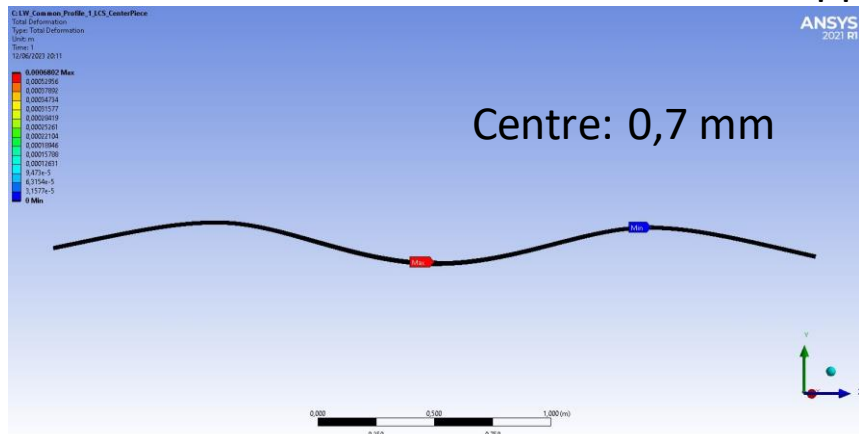
Deformation simulation of the profile by the gravity: 0,5 mm



Profile of FD2 TCO or cryo-tubes side (it is the longest)



Deformation simulation in the worst cases applying 100 grams on the centre or extreme:

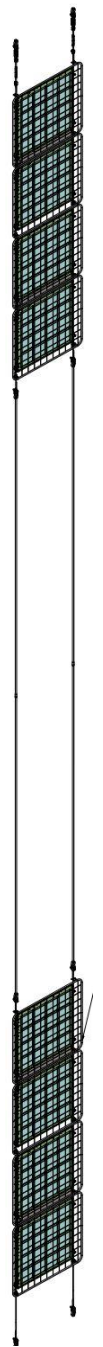
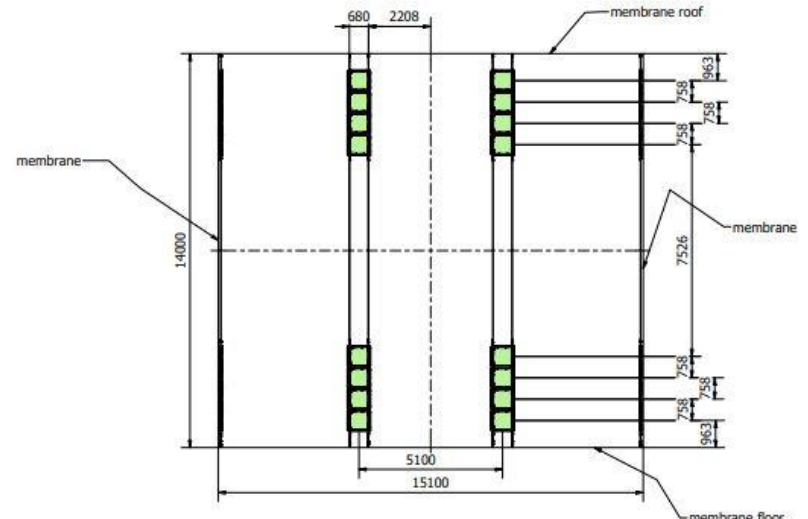
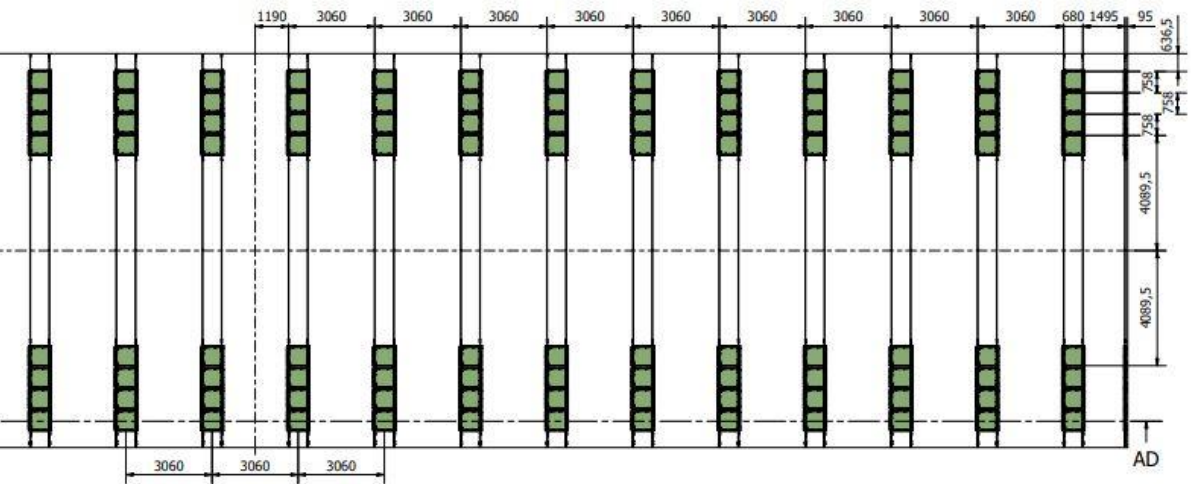
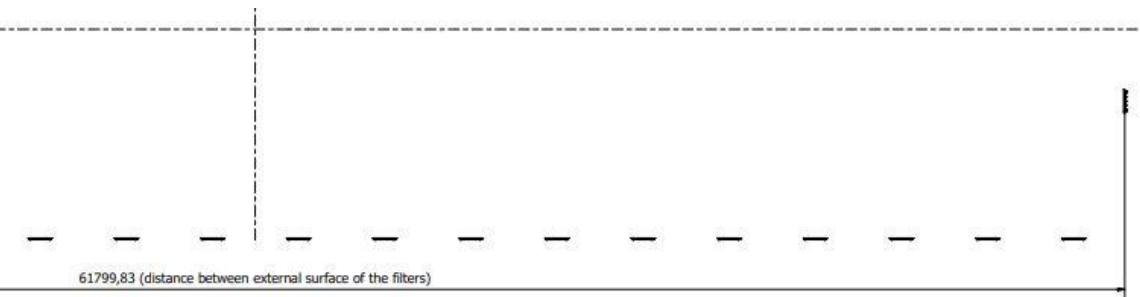
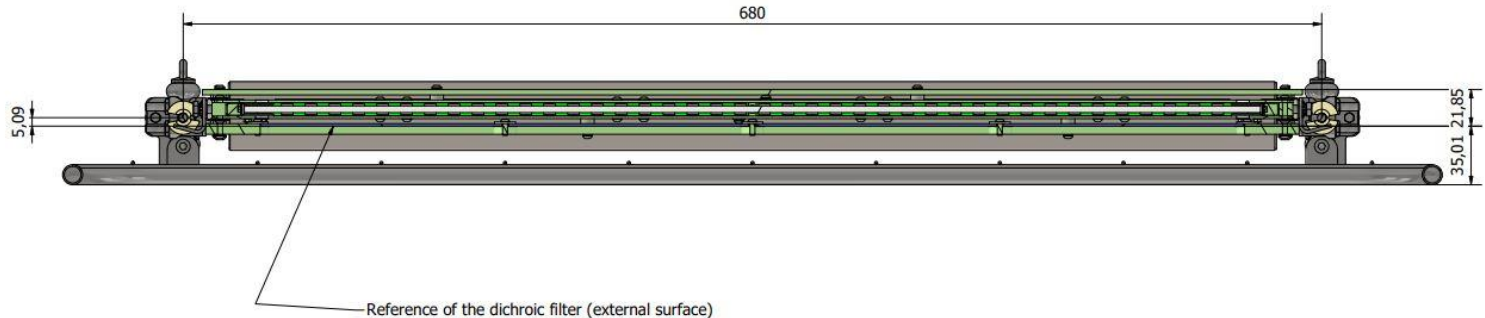


# 4.- DUNE-FD2 Membrane PDm distribution.

Actual 3D & 2D drawing on EDMS:

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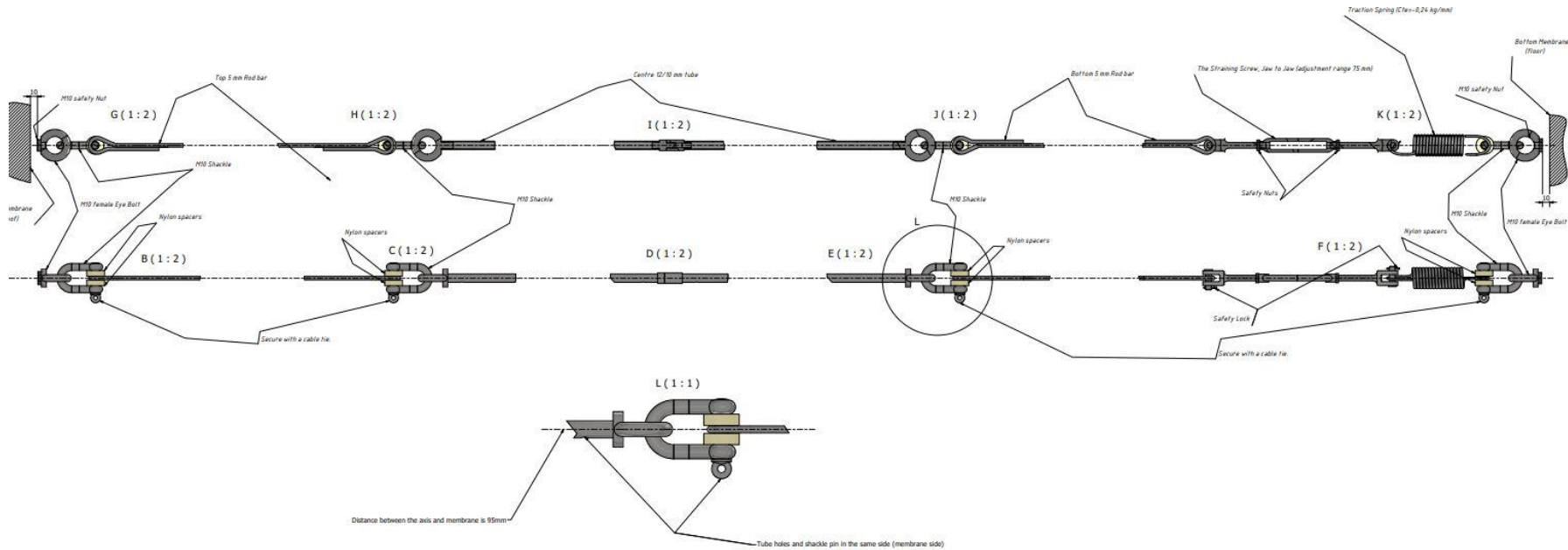


#### 4.- DUNE-FD2 Membrane PDm distribution.

Actual membrane suspension system on EDMS:

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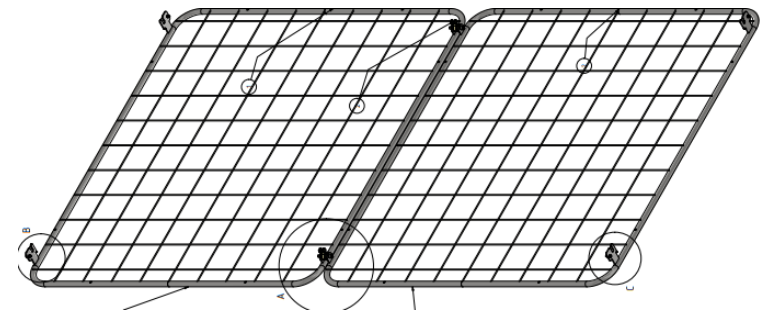
**Once the Suspension Lines are installed, adjust the Straining Screw, to pre-tension the Spring about 40 mm (aprox. 100N).**

**Check the lock nuts, on the eyebolts and the Straining Screw. Once the installation is finished.**

Actual Bottom membrane shielding on EDMS:

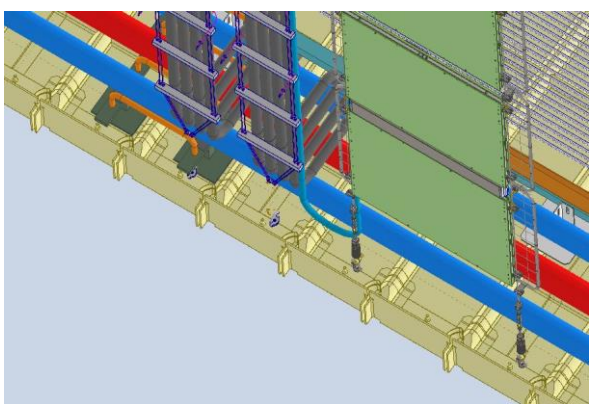
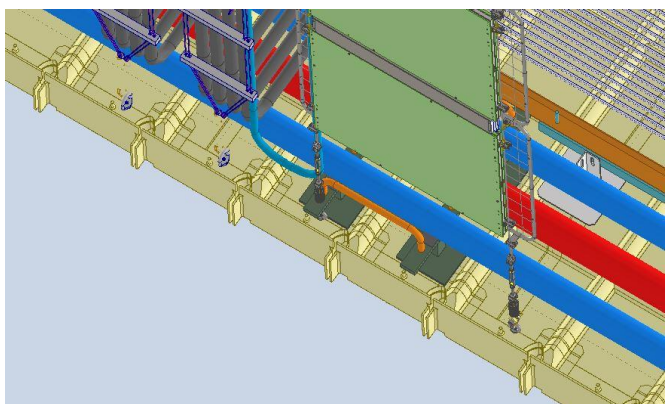
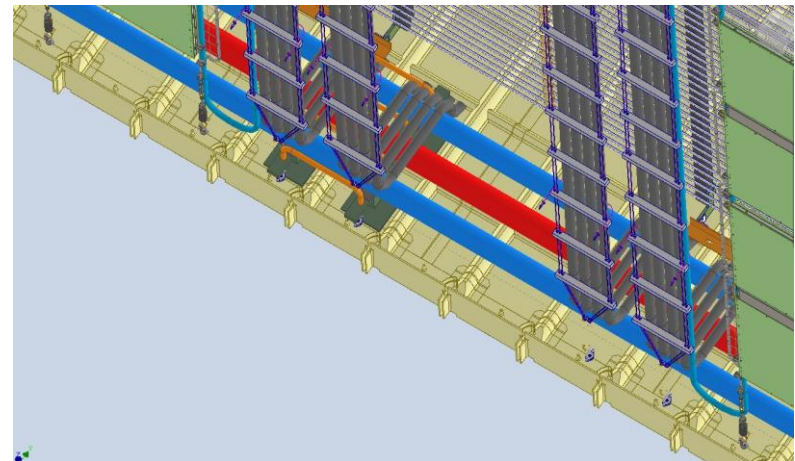
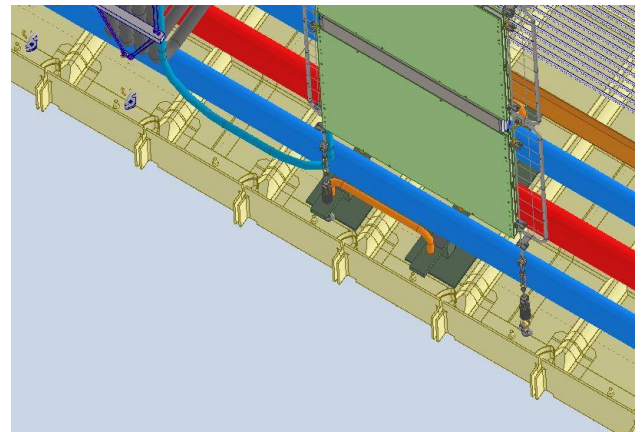
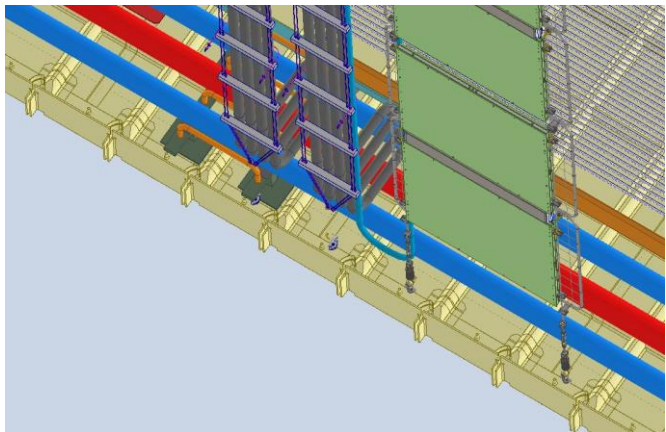
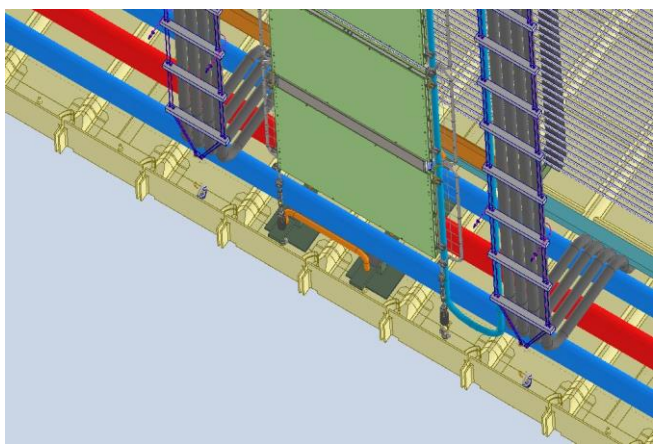
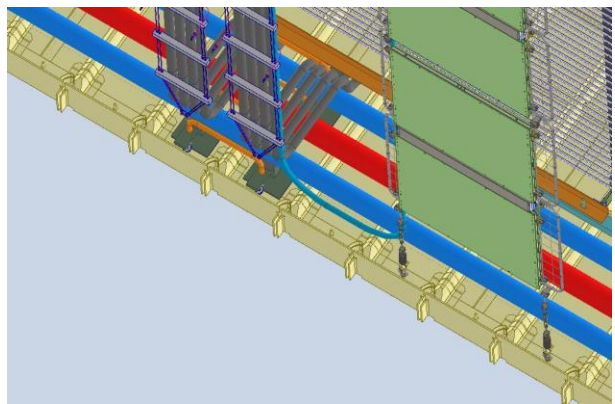
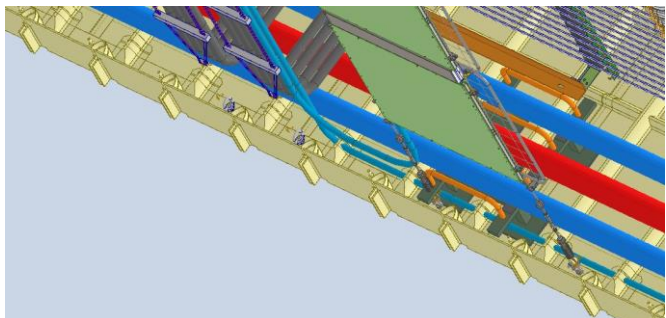
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5.- DUNE-FD2: Open question.

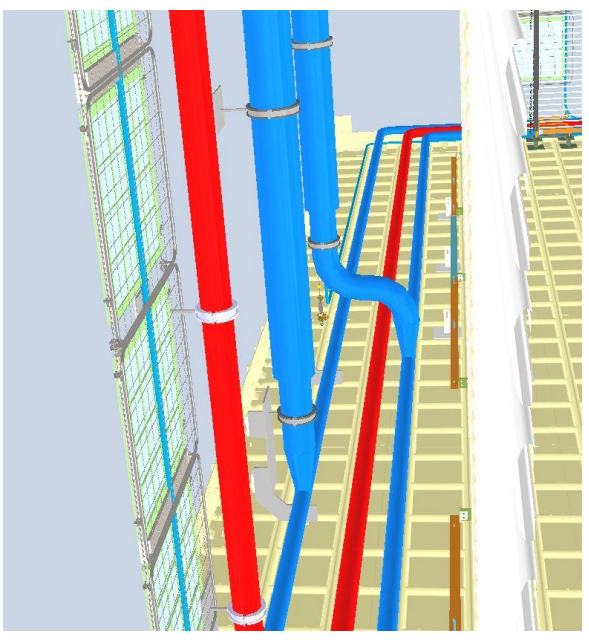
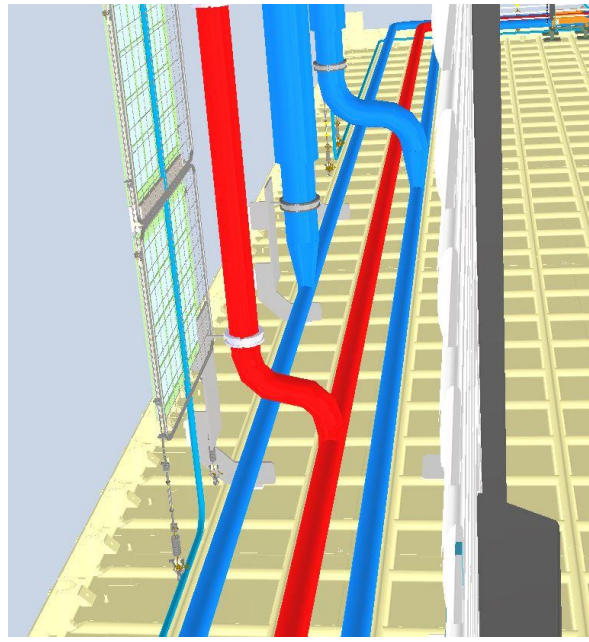
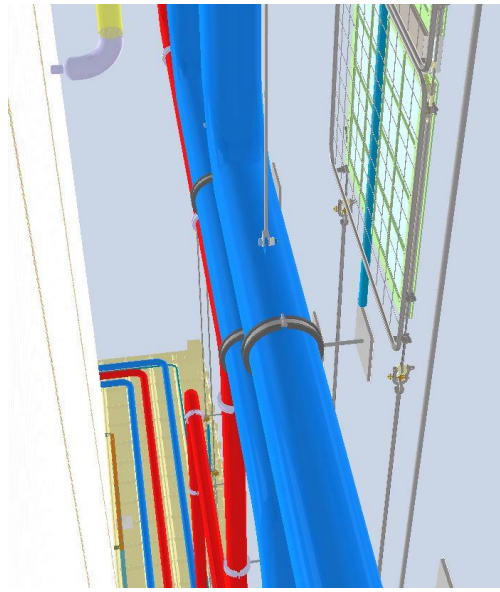
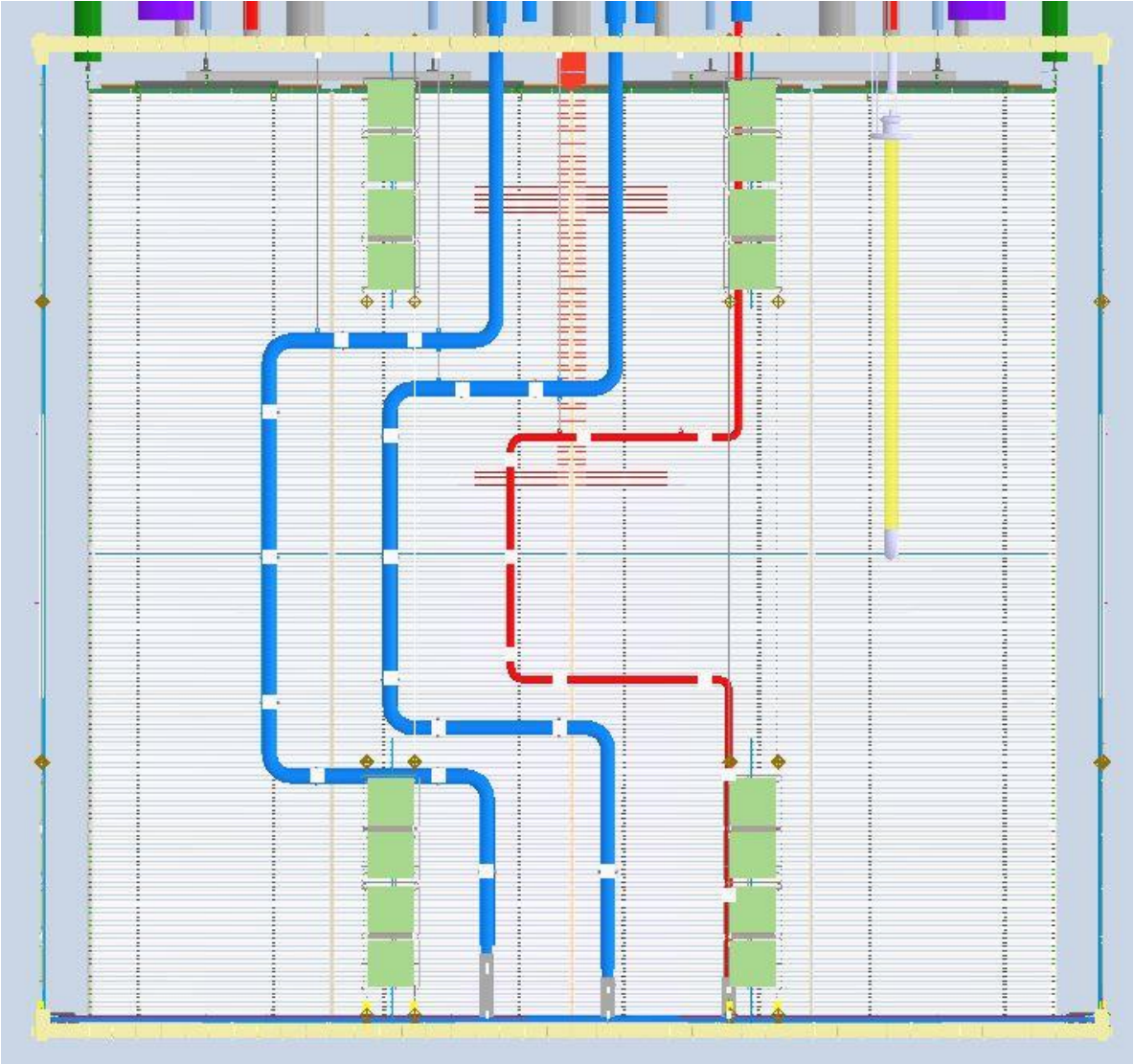
Interferences with cryo tubes on floor membrane.





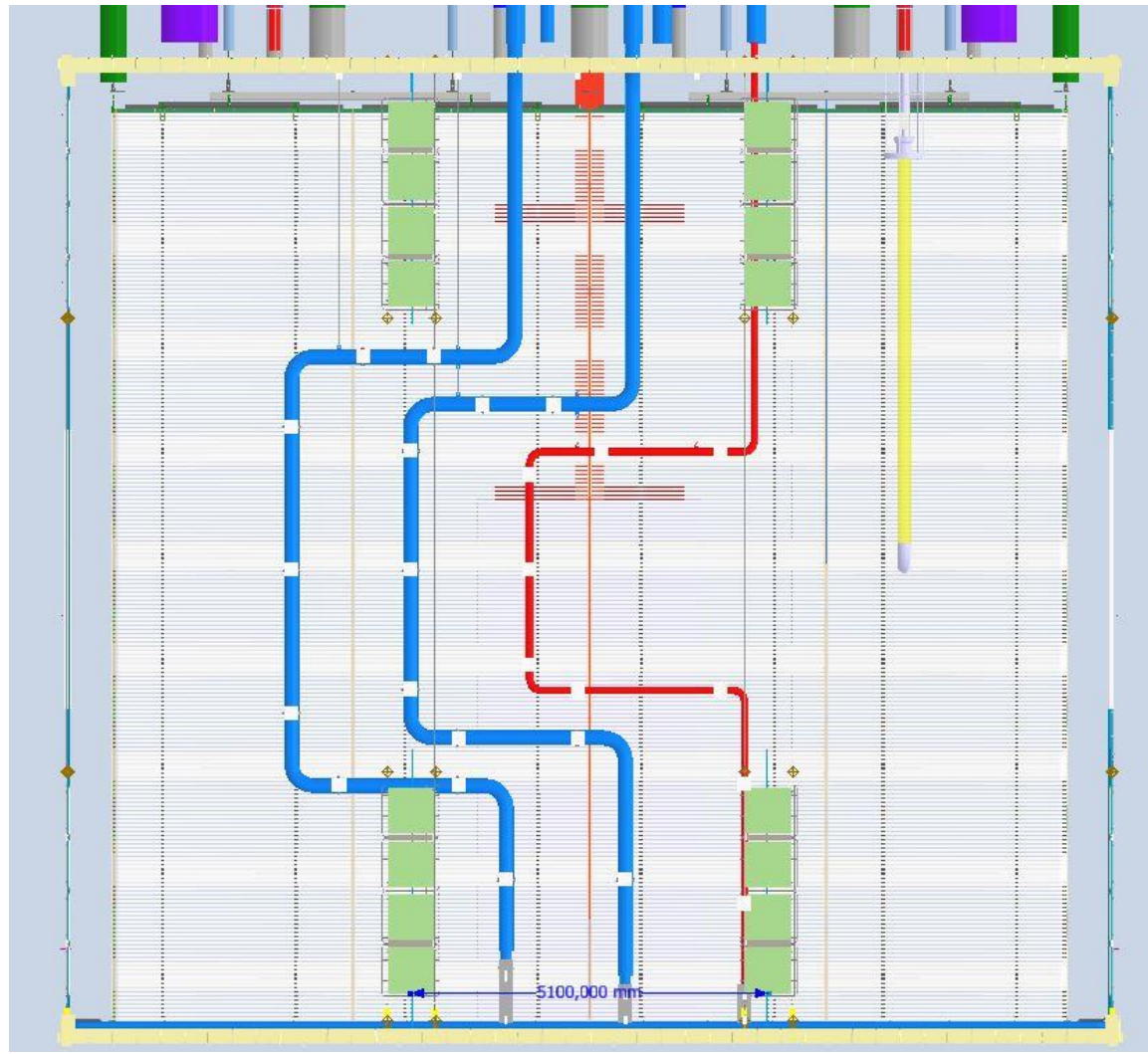
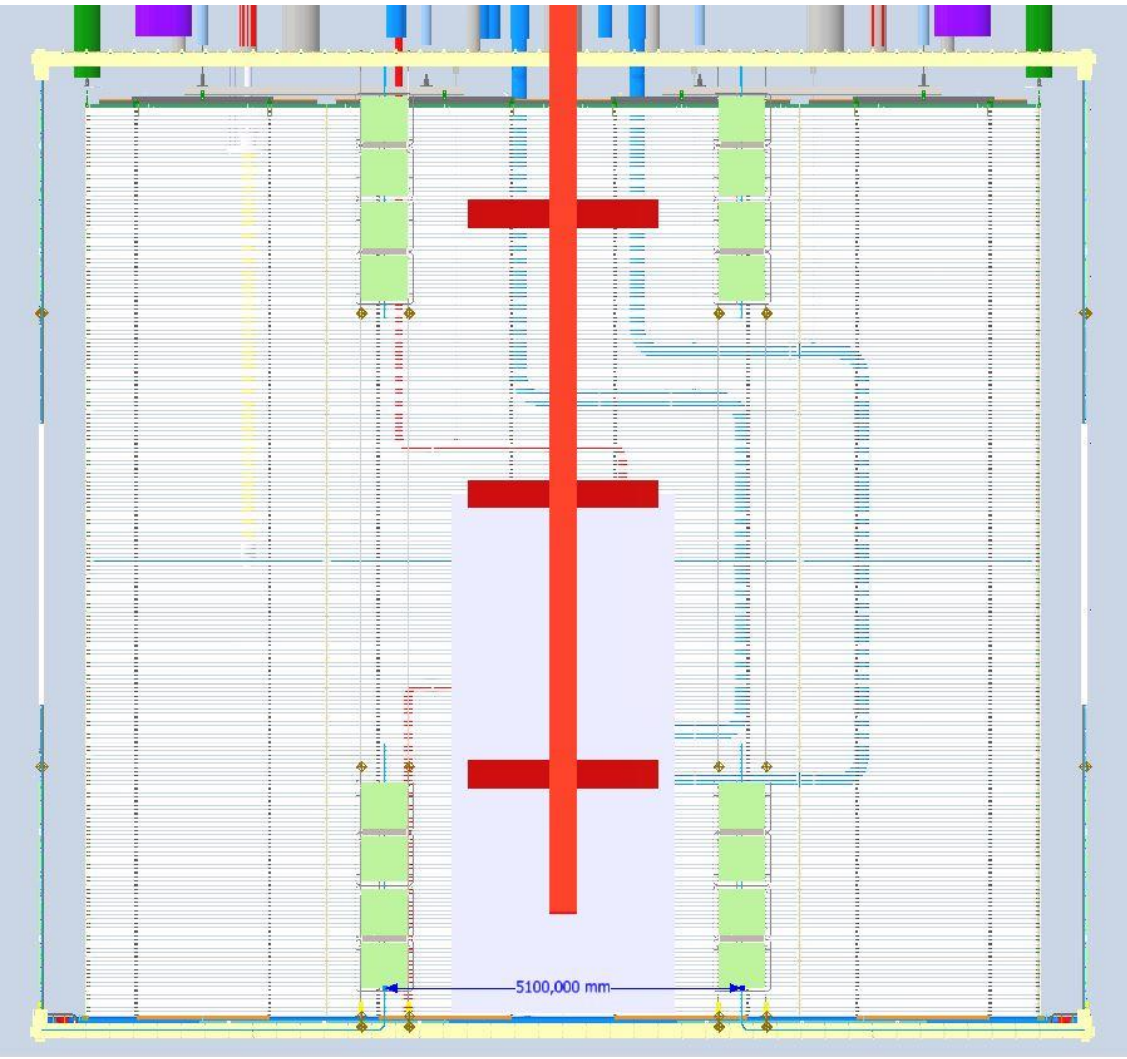
5.- DUNE-FD2: Open question.

Interferences with cryo tubes on vertical membrane not-TCO side.



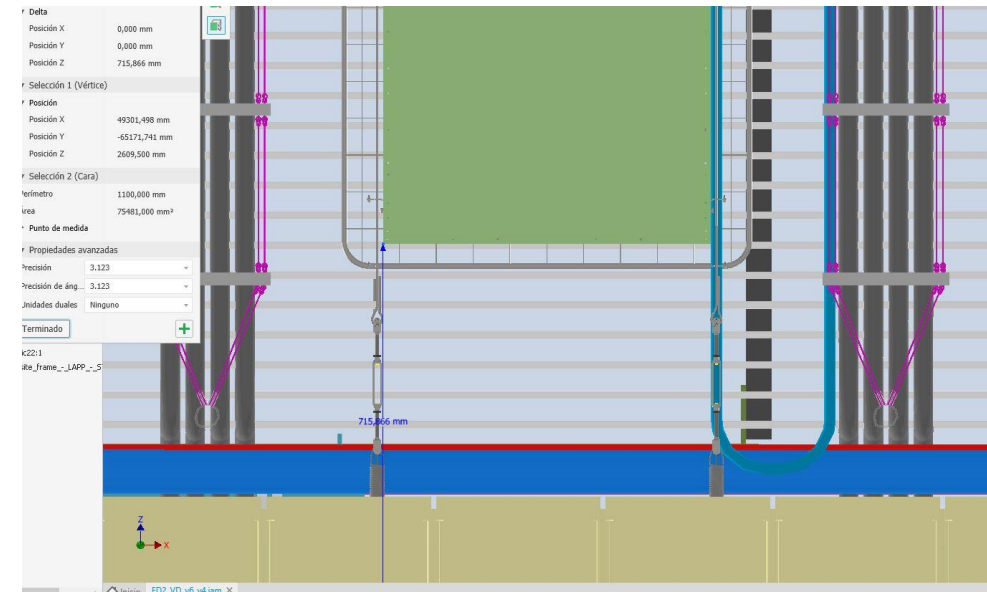
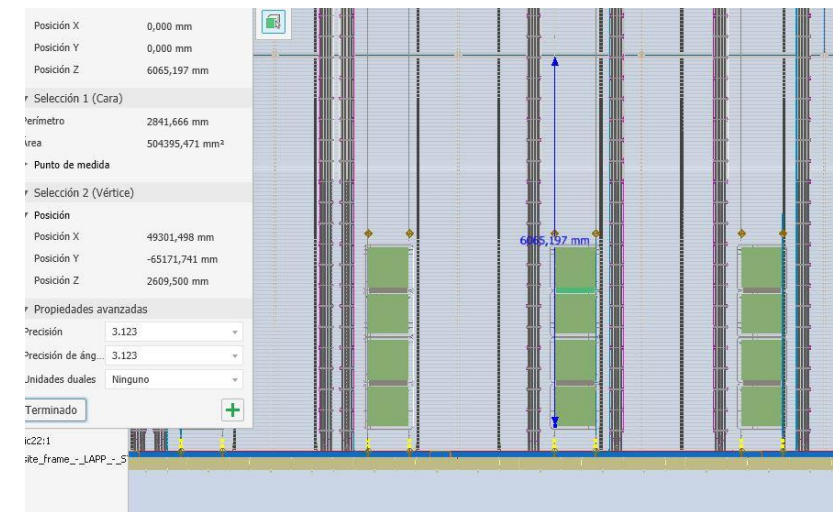
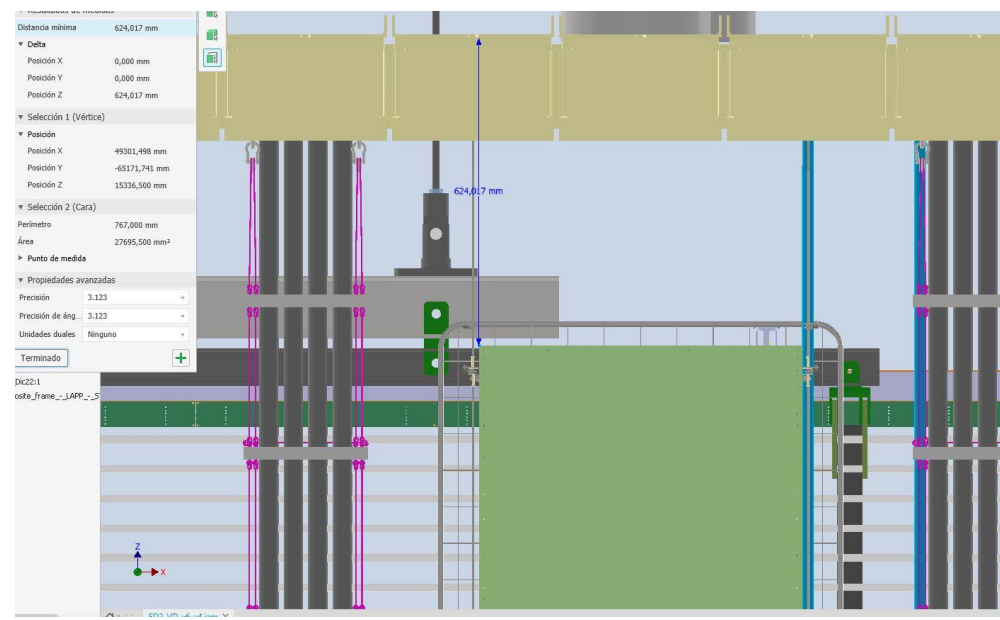
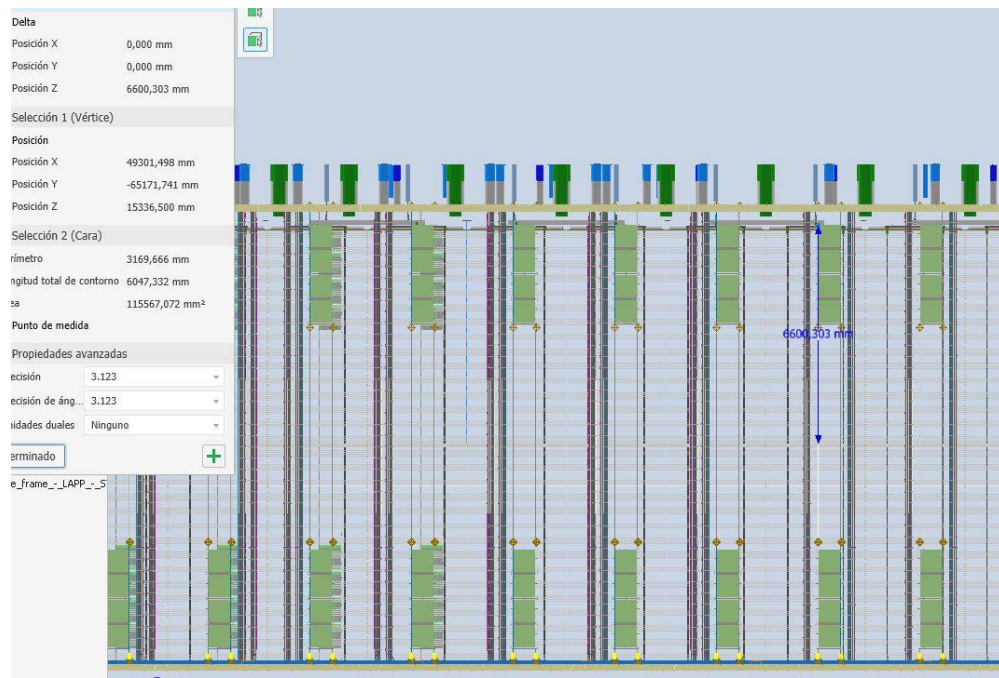
5.- DUNE-FD2: Open question.

To fix the position of PDM columns on the TCO side and Cryo tubes side (5100 mm actual 3D).



# 5.- DUNE-FD2: Open question.

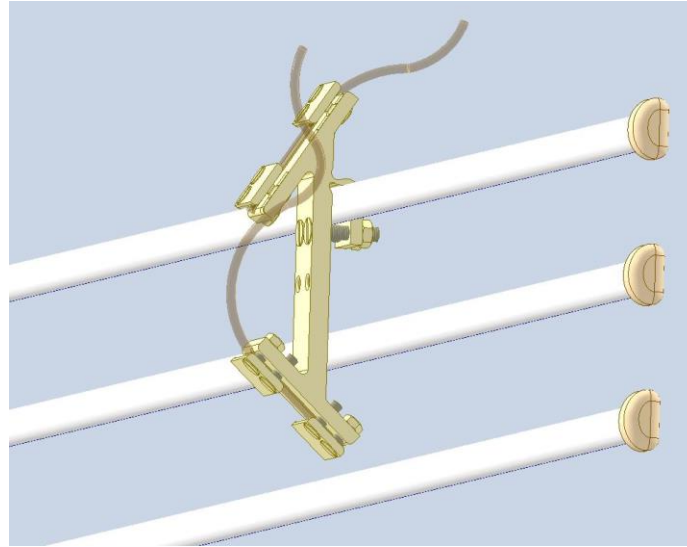
To fix position of the PDM on the vertical position on the FC as much as possible and cantering from cathode its positioning.



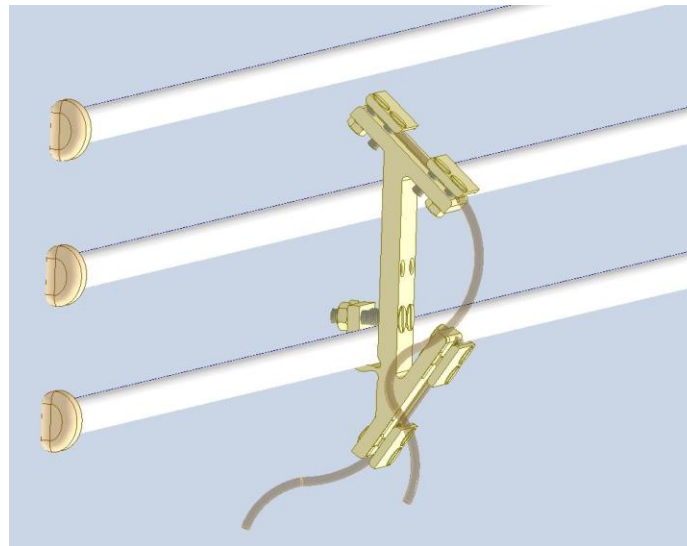
## 5.- DUNE-FD2: Open question.

New proposal to fix the bottom Photon Detector Calibration system: Fixed on the last FC profile by nylon elements, including screws and nuts.

Same proposal as the ProtoDUNE-VD.



Top Position.



Bottom position.