



ITS3 activities in Bari

BBM6

BBM6 Thermal Test Assembly

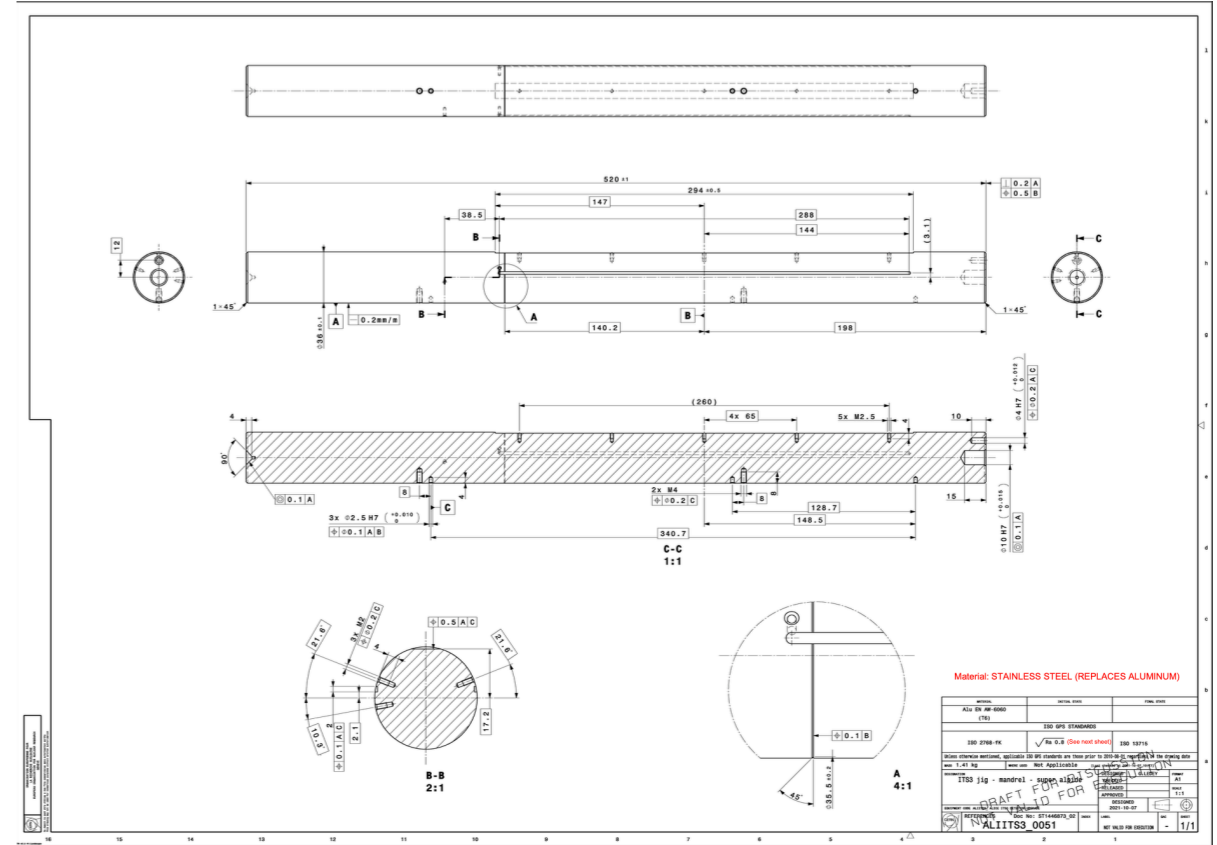
- (A) Mandrel design and realisation
- (B) Alignment and gluing jigs design and realisation
- (C) Assembly design
- (D) Support/cooling structures production
- (E) Heaters production

BBM6 TTA - (A) Mandrel design and realisation

- Super-ALPIDE mandrel
 - Exploring case-hardening
 - Really low Ra value
 - Avoid surface damage during handling
 - Delivery time 3 weeks

- If final ITS3 L0/L1/L2 design available, push for parallel production

Super-ALPIDE mandrel



520 mm

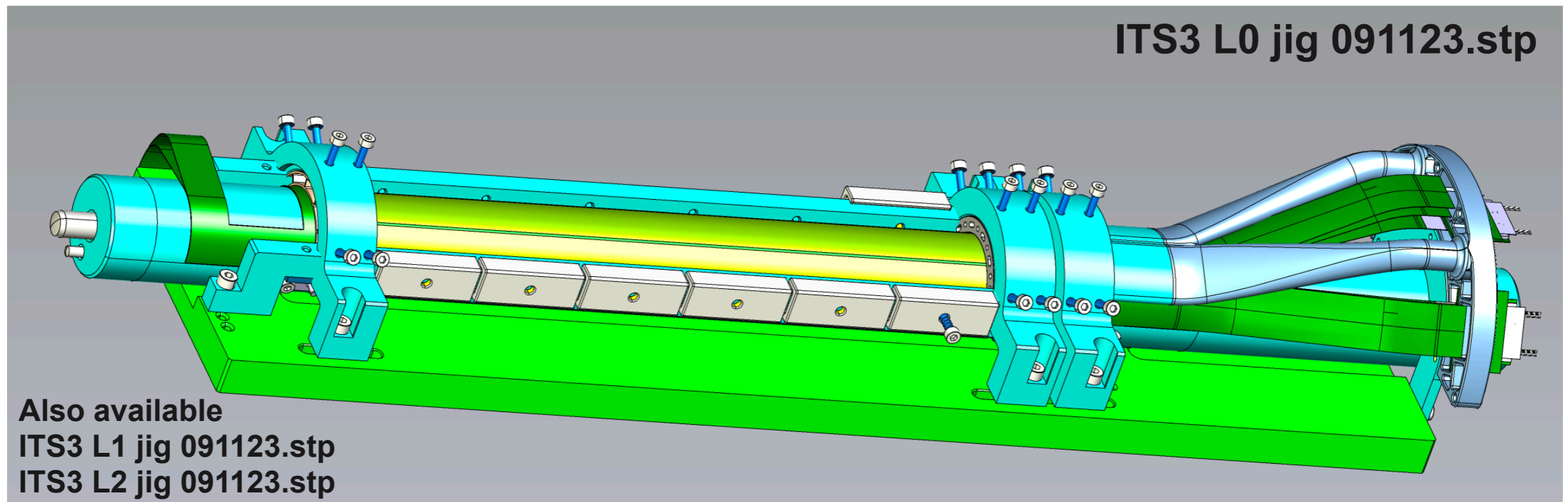
413 mm

$\sqrt{R} 0,05$

Ra 0,2

BBM6 TTA - (A) Mandrel design and realisation

Last shared version from 09/11/2023.
Is this still valid? Can this be used for production?



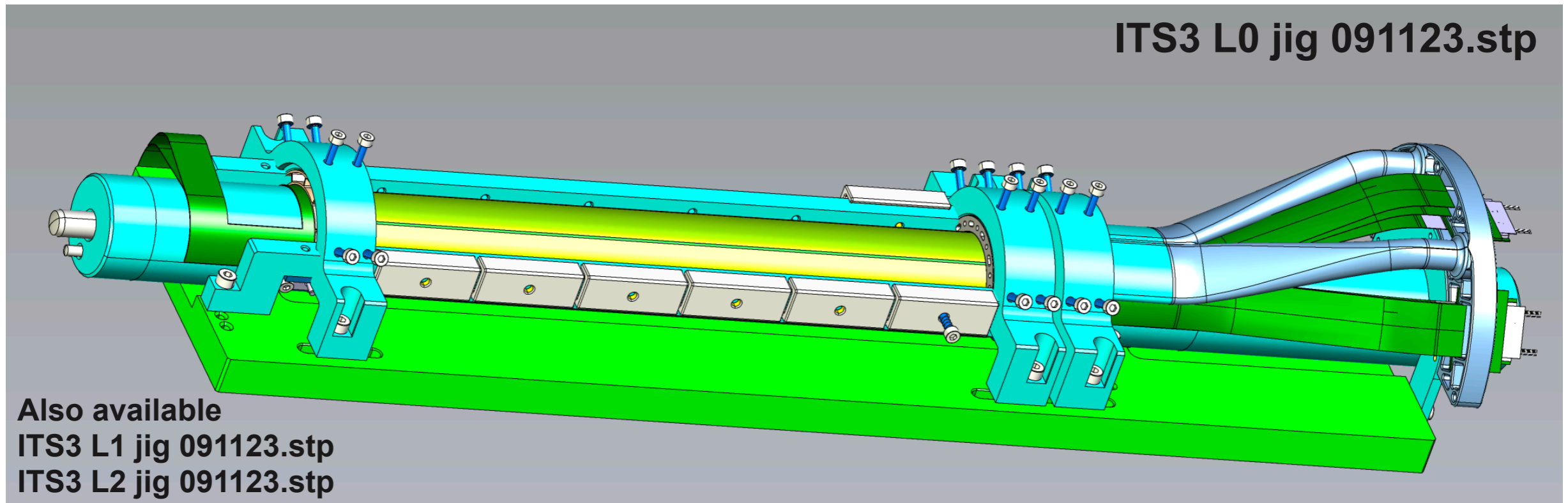
BBM6 TTA - (A) Mandrel design and realisation

BBM6 TTA - (B) Alignment and gluing jigs and realisation

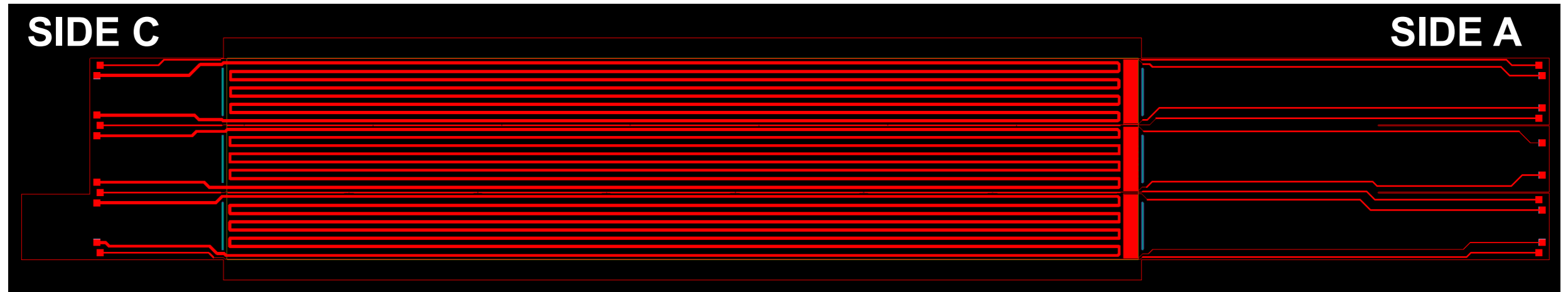
Last shared version from 09/11/2023.

Is this still valid? Can this be used for production?

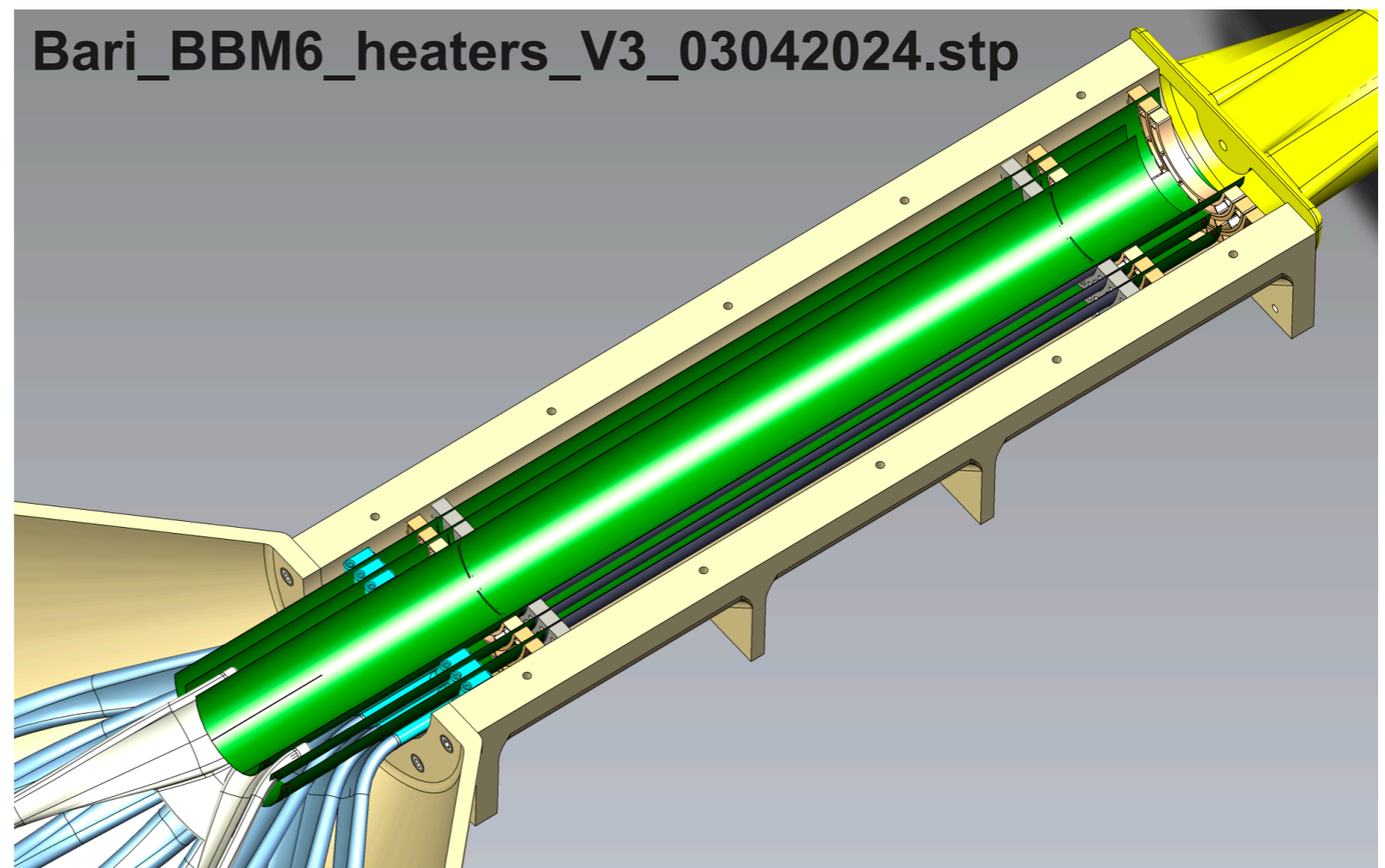
Does this apply also to the gluing tools?



BBM6 TTA - (E) Heaters production



- Three power dissipation regions: pixel matrix, endcap, readout
- Longer design to include simulator for the FPCs (both sides)
- Pads for serpentine powering cables outside heating volume

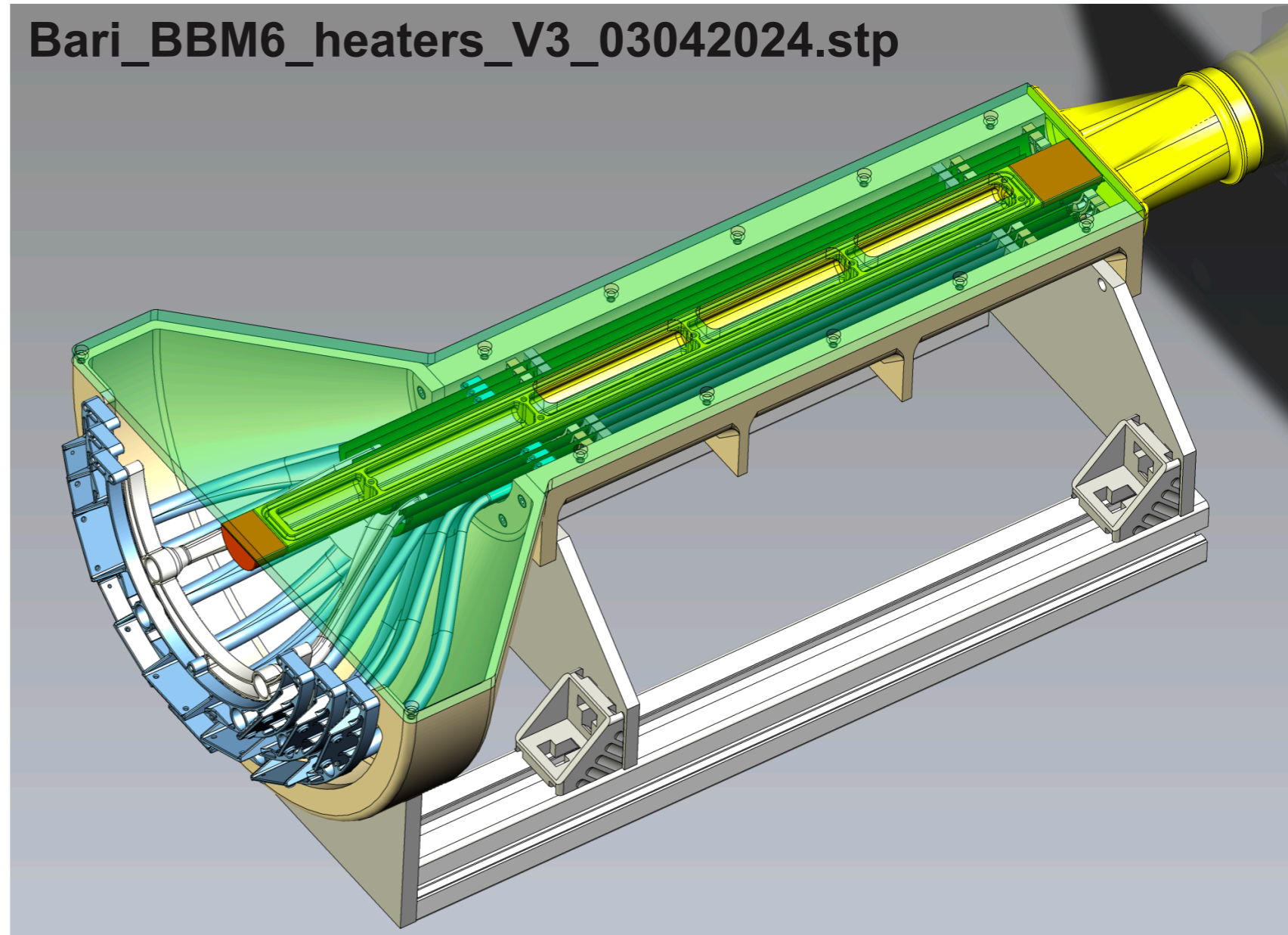


BBM6 TTA - (E) Heaters production

- Production under discussion with
 - Rui : meeting this morning
 - Swissflex Microcircuits AG: Monday morning
- ➔ Details from Massimo

BBM6 TTA - (C) Assembly design

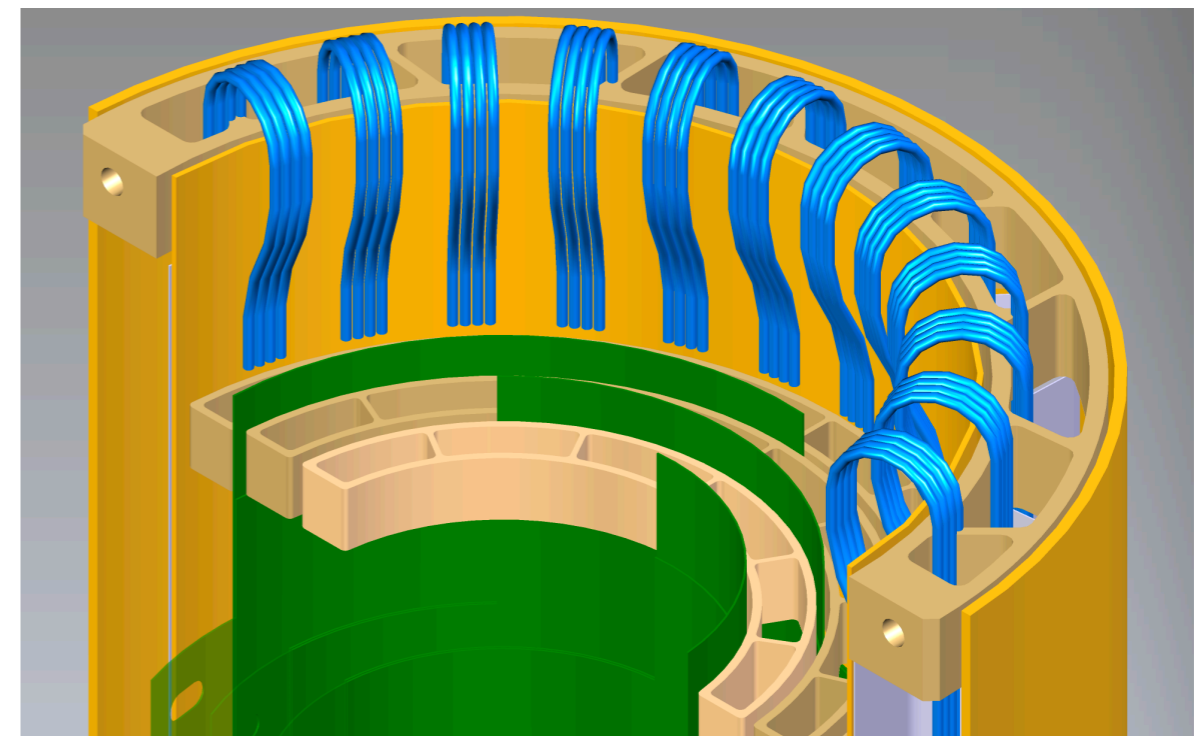
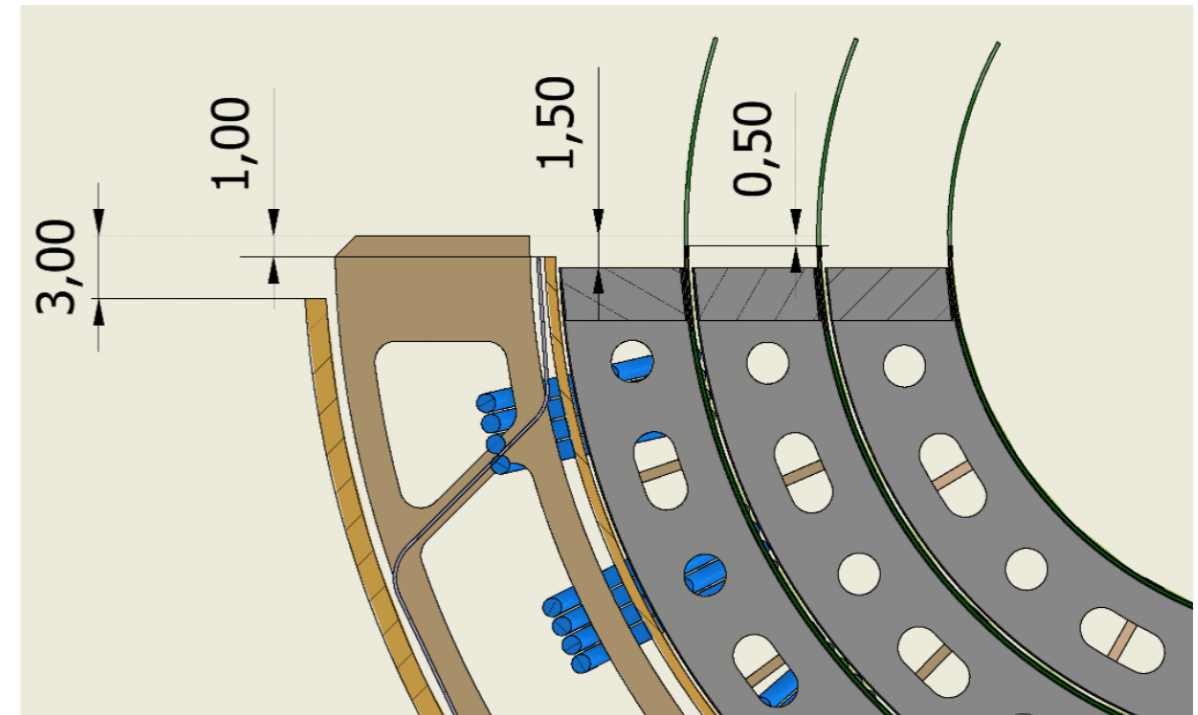
- Design quite advanced
- Details definition by mail exchange with Gael/Aitor/Massimo, implementation by Vincenzo
- Few modifications to be implemented after last exchange (Friday) → Few points to be clarified, better in a phone-call. Examples in the next slides.



BBM6 TTA - (C) Assembly design

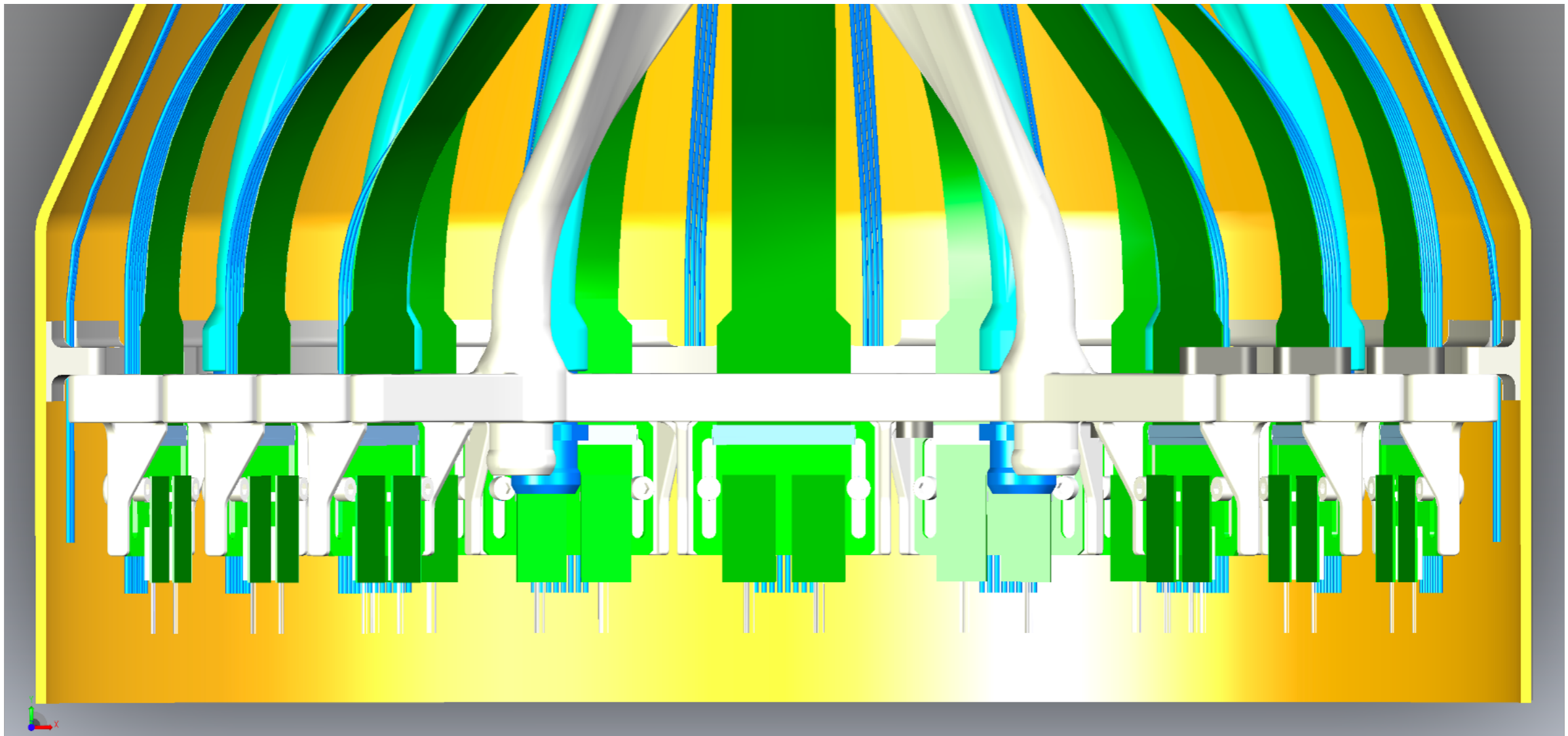
{Gael}: “We have a gap of 1mm between the cyss and Plexiglas since we will have 2mm between top and bottom detector (1mm between sensors and 2mm between cyss if you look in the step) Massimo and Aitor did some airflow tests with that gap open and close” → **Request needs clarifications**

{Gael}: “And the 4 pins holes in the cyss for the gluing jig (same position as the cyss in the step)” → **Request needs more details**



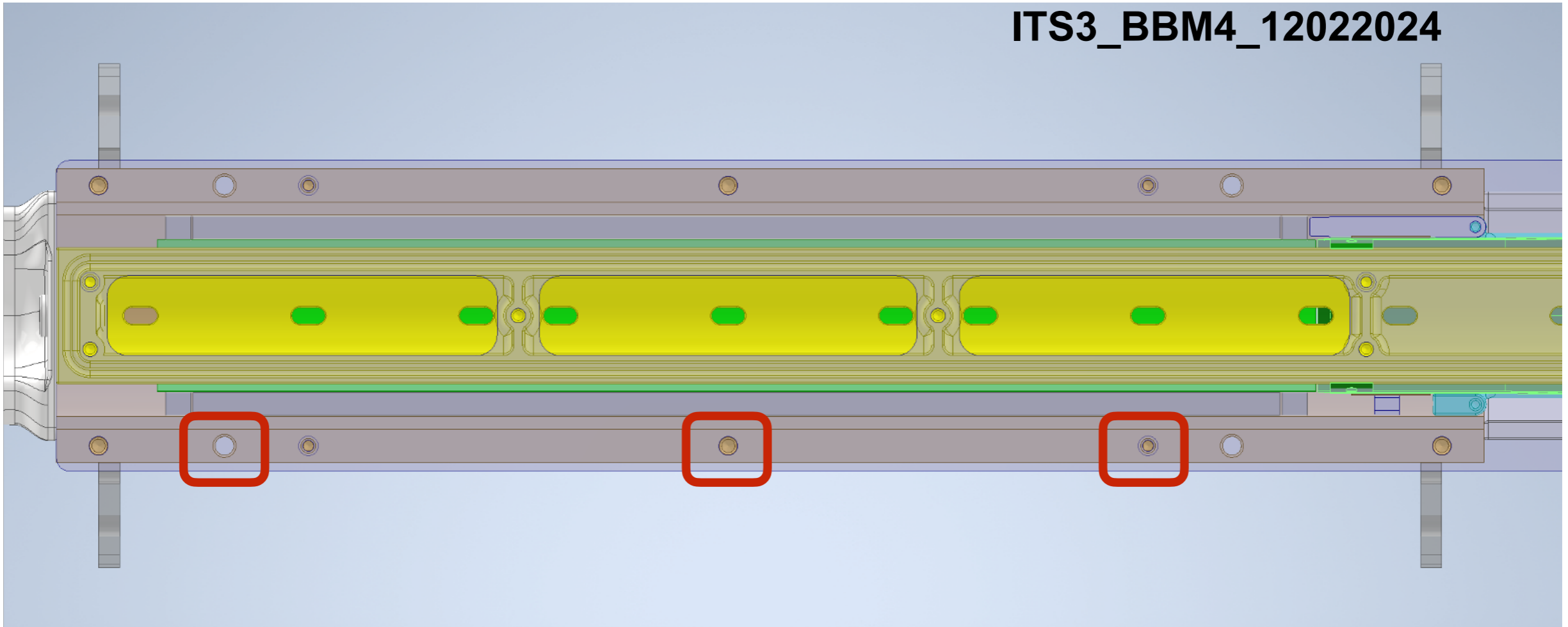
BBM6 TTA - (C) Assembly design

{Gael}: “Can you change the outside diameter of the cone to 290 or 300mm and add some holes to have the possibility to fix an extension like the service barrel in some future tests ?” → **Yes, if needed, but needs more informations**



BBM6 TTA - (C) Assembly design

ITS3_BBM4_12022024



Holes in the CYSS without corresponding opening in the covering plexiglass.
Not implemented at the moment.
Should be included? At which position?

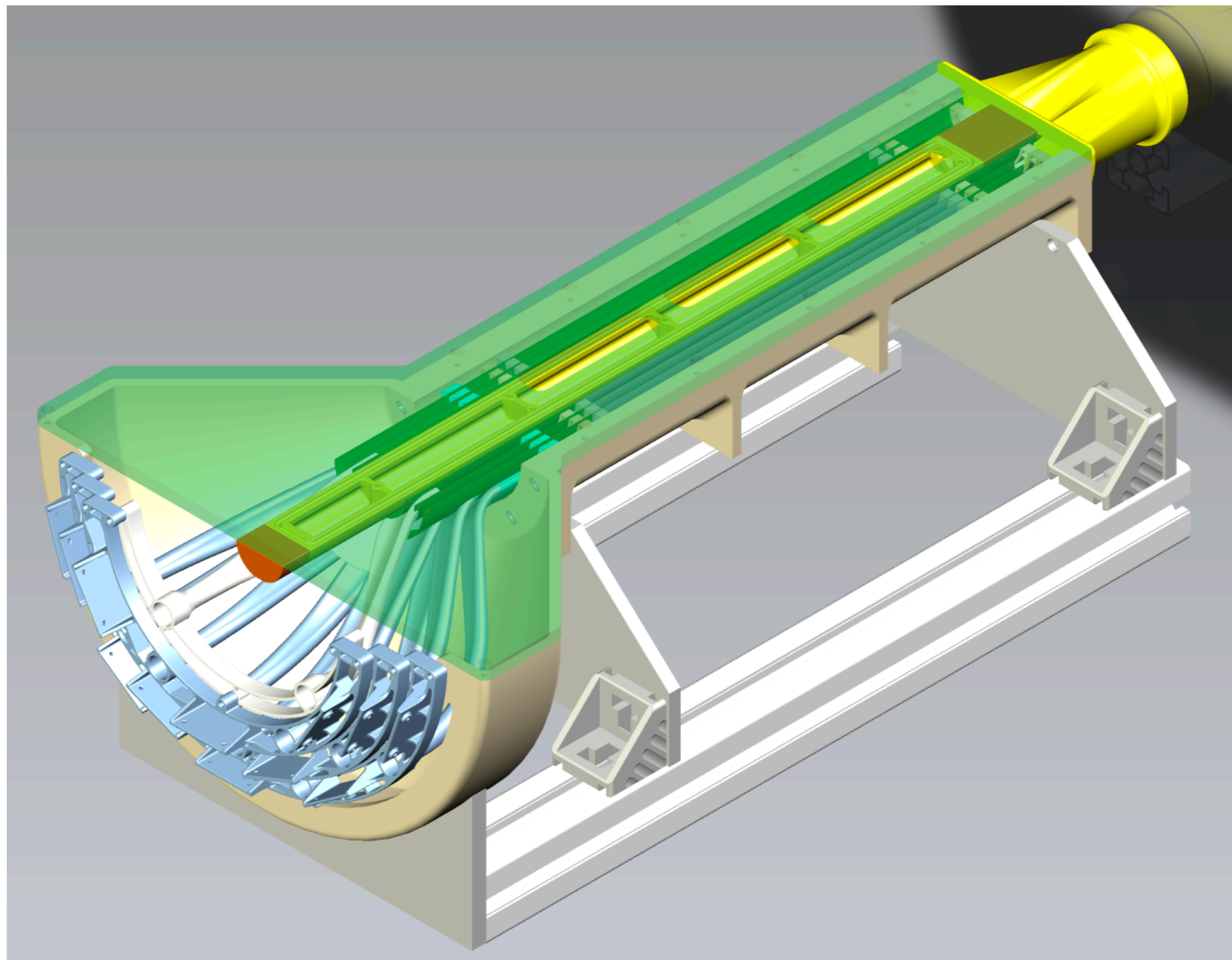
BBM6 TTA - SUMMARY TABLE

COMPONENT	DESIGN STATUS	PRODUCTION STATUS
L0, L1, L2 mandrels	version 9/11/2023 (most recent?)	0%
Bending/bonding setup	AVAILABLE	90%
Half-rings and longerons alignment/gluing tools	version 9/11/2023 (most recent?)	0%
Layer-to-layer alignment/gluing tools	??	0%
L0, L1, L2 carbon foam half-rings	from ITS3 assembly version 11/04/2024	0%
L0, L1, L2 carbon foam longerons	modified version with holes for PT1000 wires version 02/04/2024	0%
L0, L1, L2 3d printed half-rings for FPC	from ITS3 assembly version 11/04/2024	0%
L0, L1, L2 heaters + powering cables	L0 rough design available	under discussion with Rui and Swissflex Microcircuits AG
L0, L1, L2 air ducts	from ITS3 assembly version 11/04/2024	0%
Beam pipe simulator + extensions	from BBM4 version 12/02/2024	0%
C-side air collector	adapted from BBM4 version 12/02/2024	0%
CYSS	adapted from BBM4 version 12/02/2024	0%
Conical shell	adapted from ITS3 assembly version 11/04/2024	0%
Patch-panel	from ITS3 assembly version 11/04/2024	0%
PT1000 sensors + cables	—	under procurement
Covering plexiglass	adapted from BBM4 version 12/02/2024	0%
Assembly support	adapted from BBM4 version 12/02/2024	0%

BACKUP

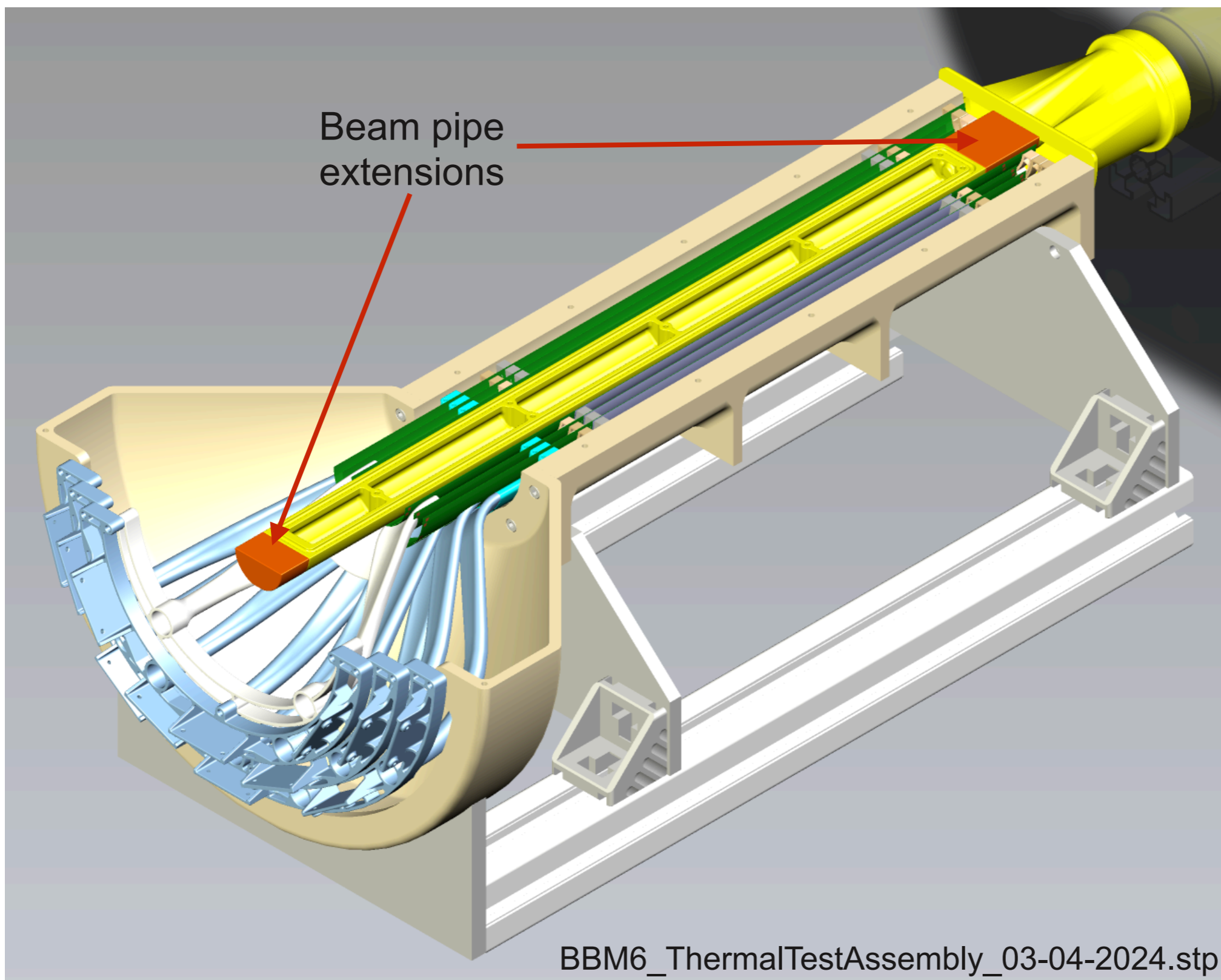


BBM6_ThermalTestAssembly_03-04-2024.stp

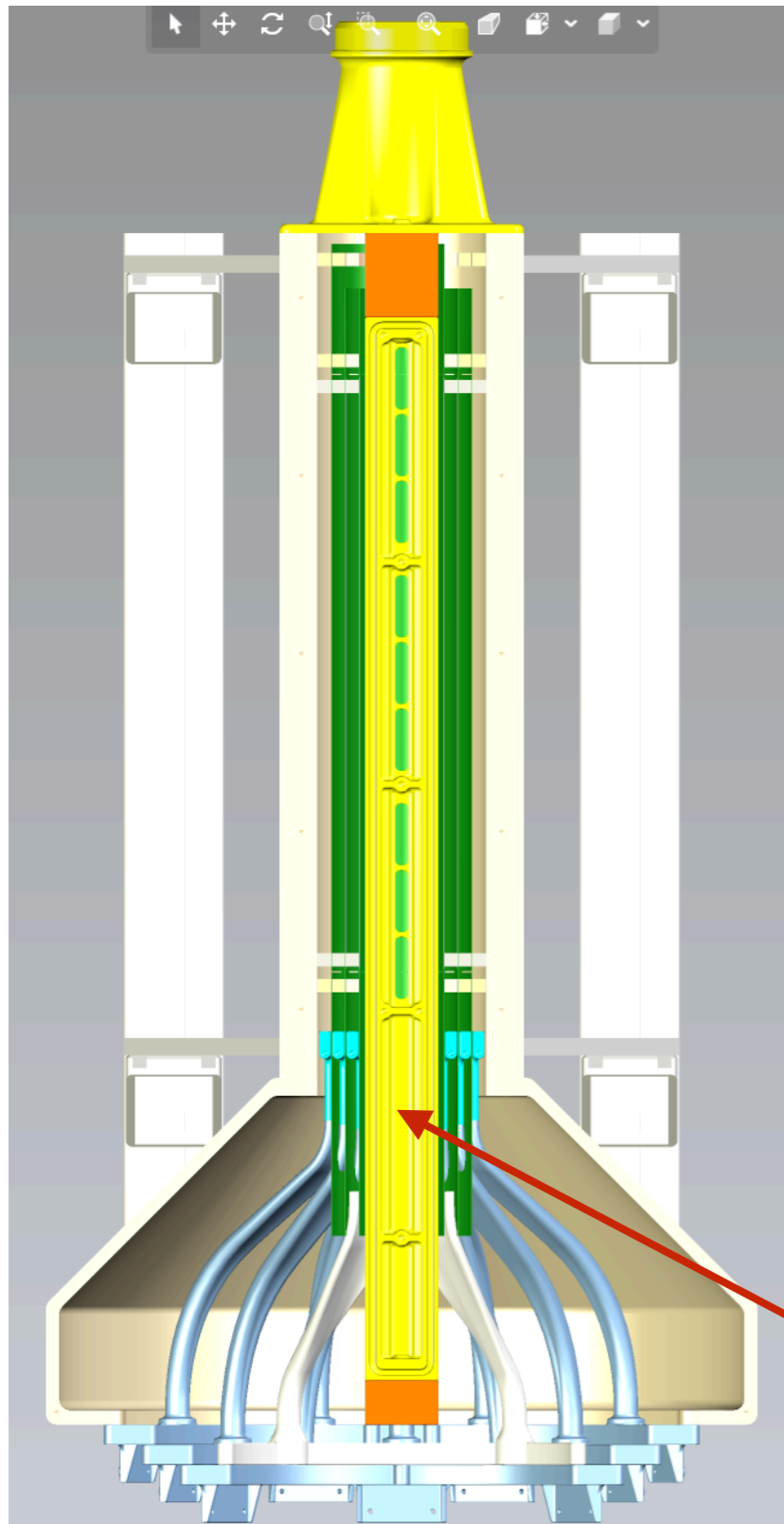




1) BEAM PIPE POSITION



1) BEAM PIPE POSITION



Is the positioning of the beam pipe (and particularly of the windows) fine with you?
Present position is entering windows in the sensor area.

Alternative solution, if you need to have windows also in the FPC are, is to shift everything on the C-side and open windows in the last beam-pipe section.

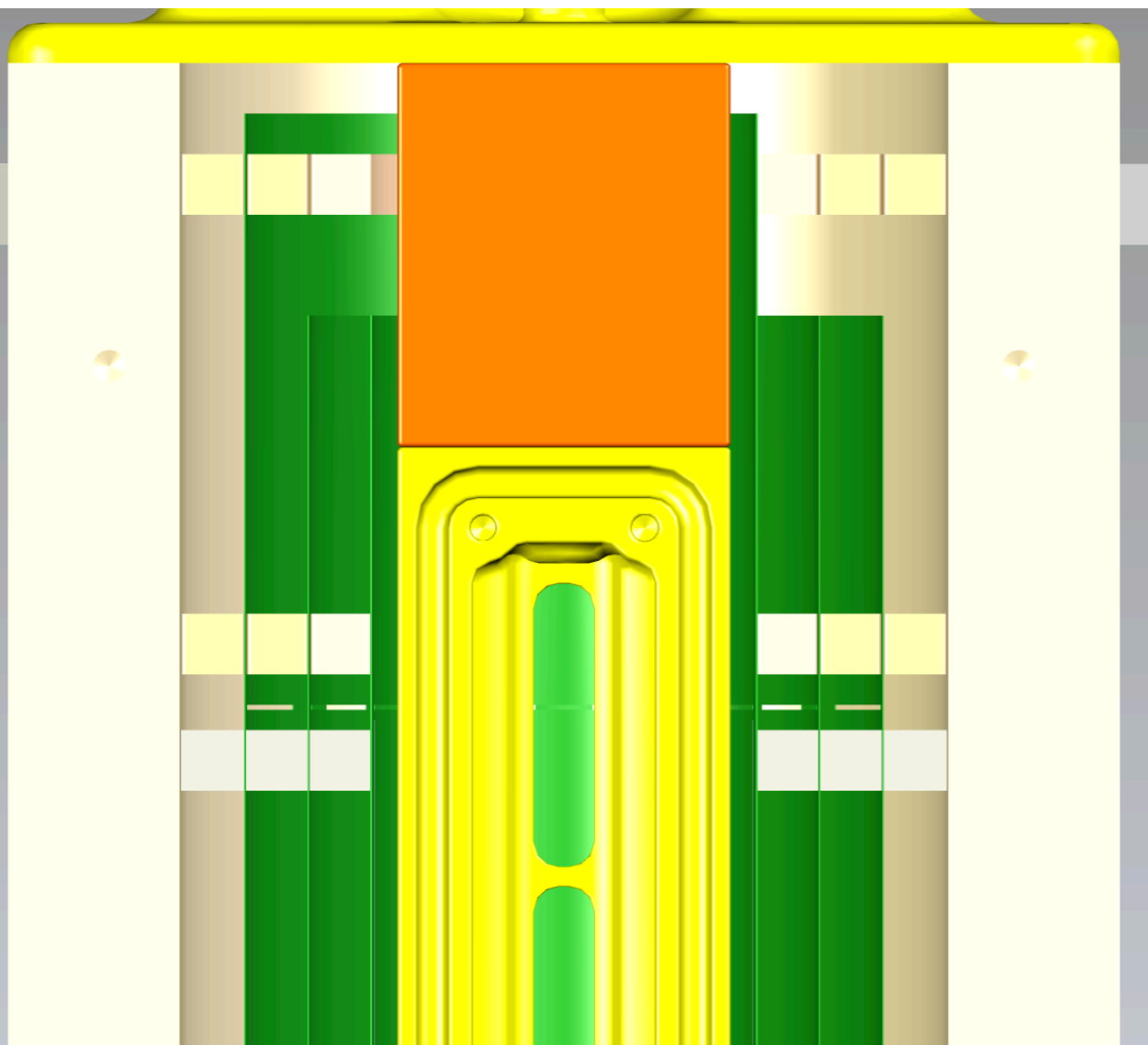
Fixing of the extensions to the beam-pipe not yet defined in the CAD.

Potentially, open new windows here

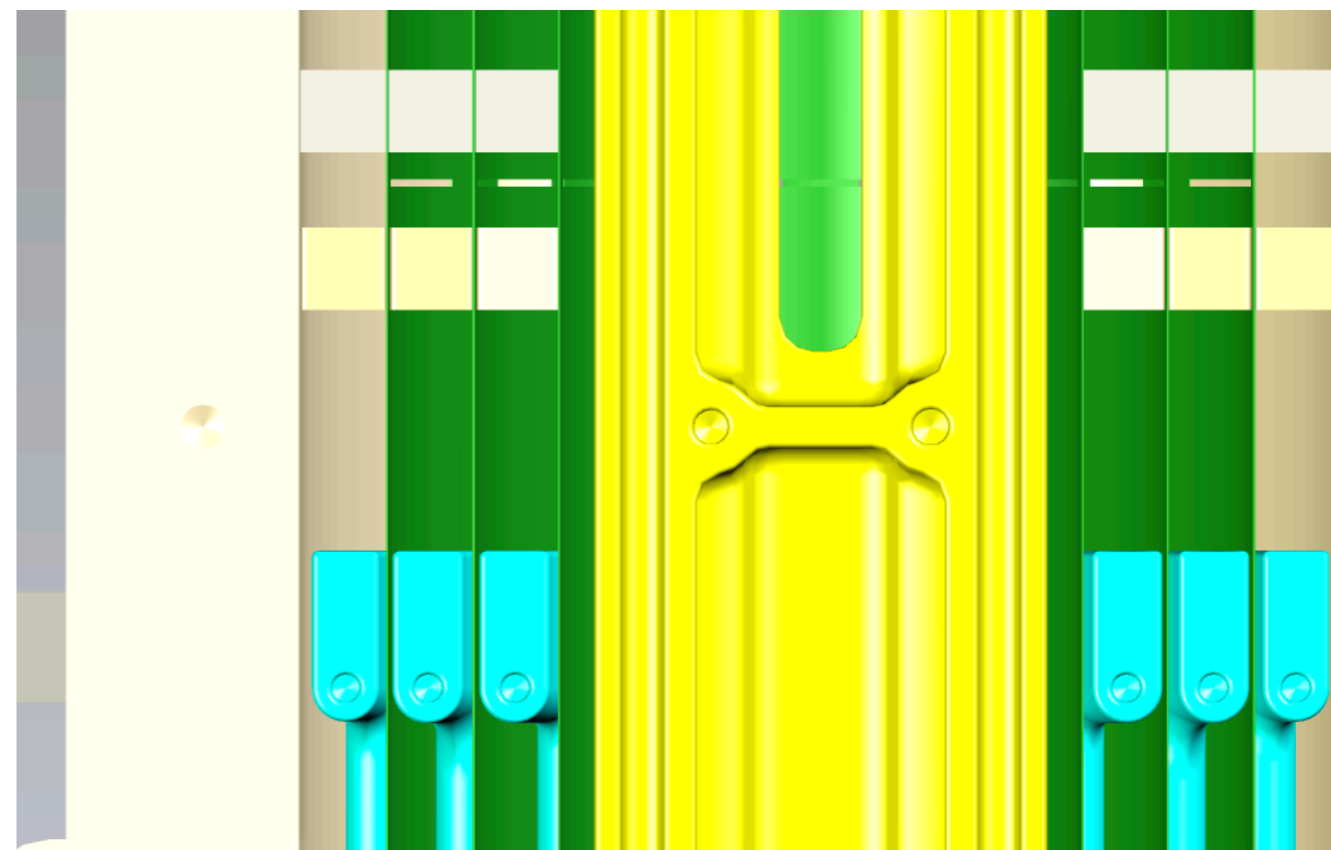


1) BEAM PIPE POSITION

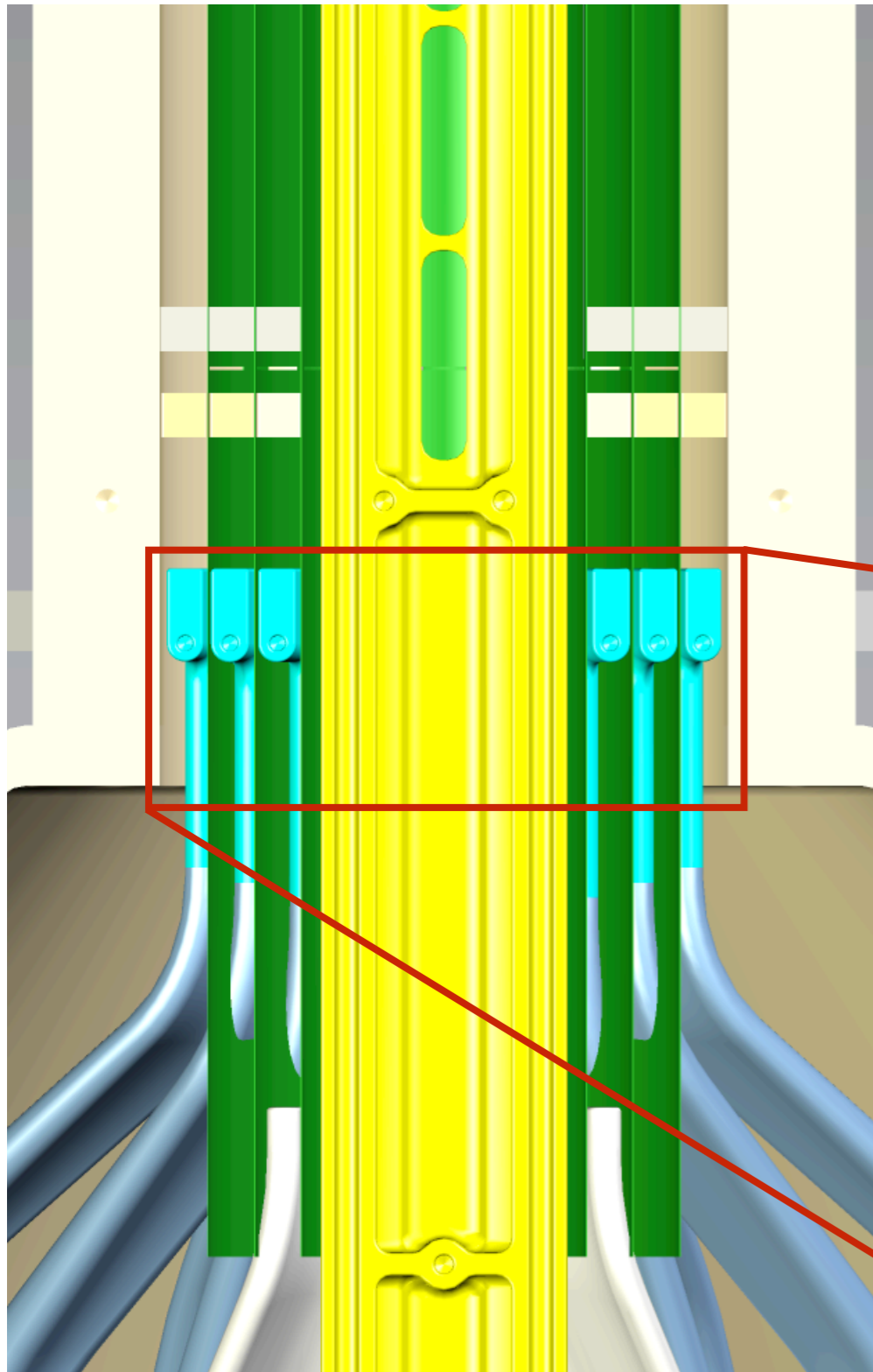
C-side



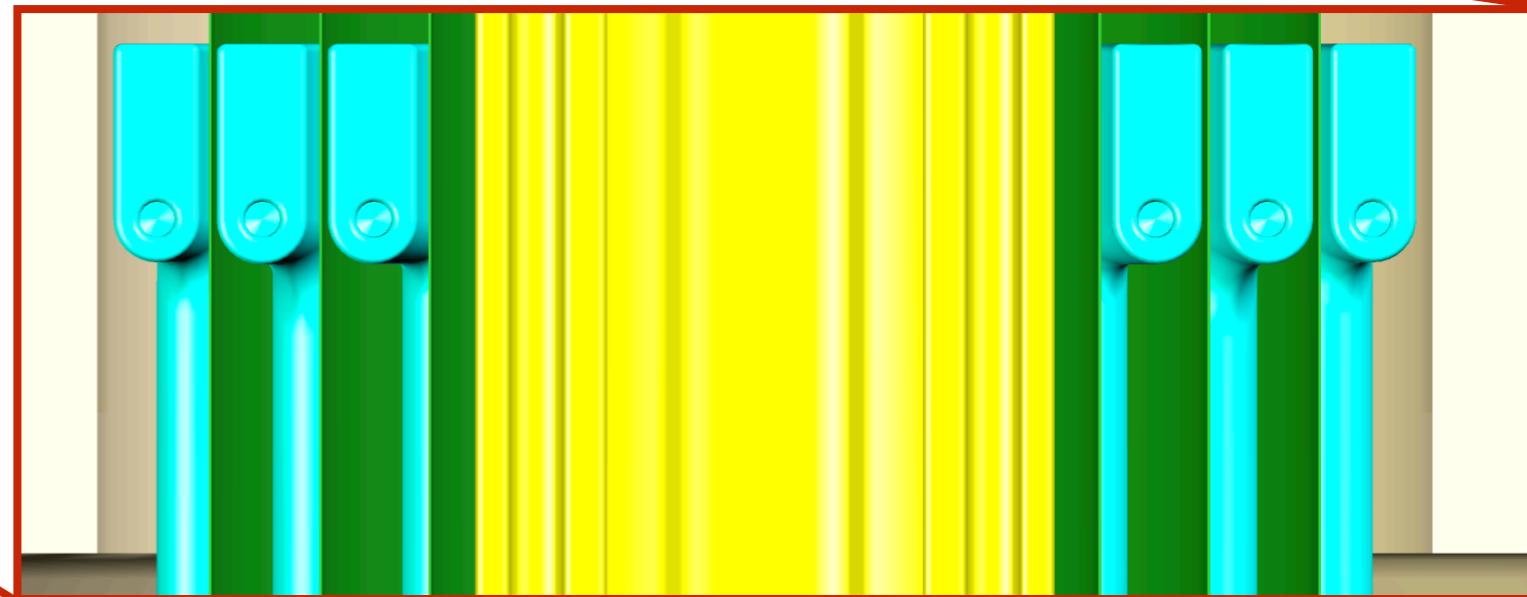
A-side



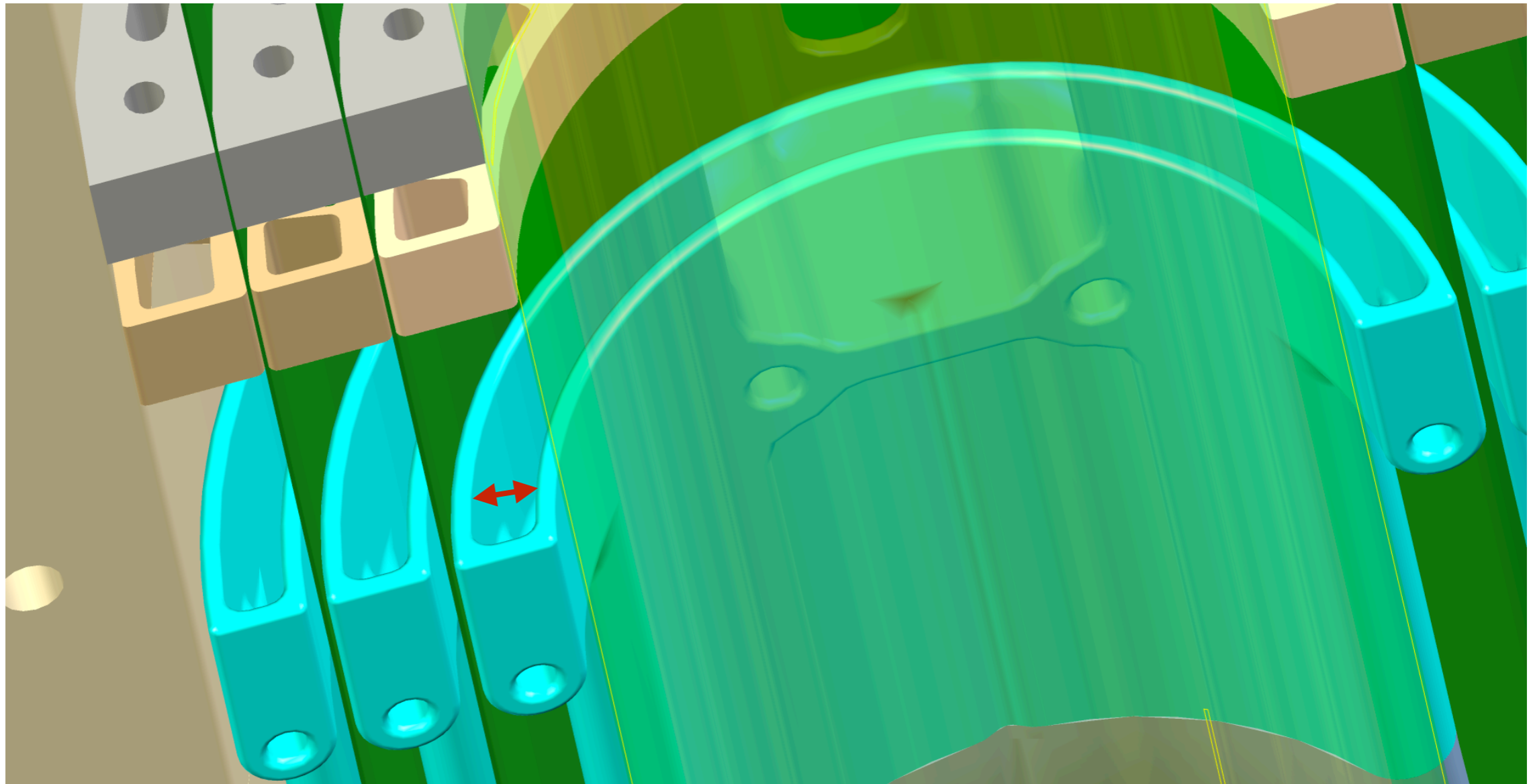
2) AIR DUCTS



Thickness of the air ducts to be fixed.

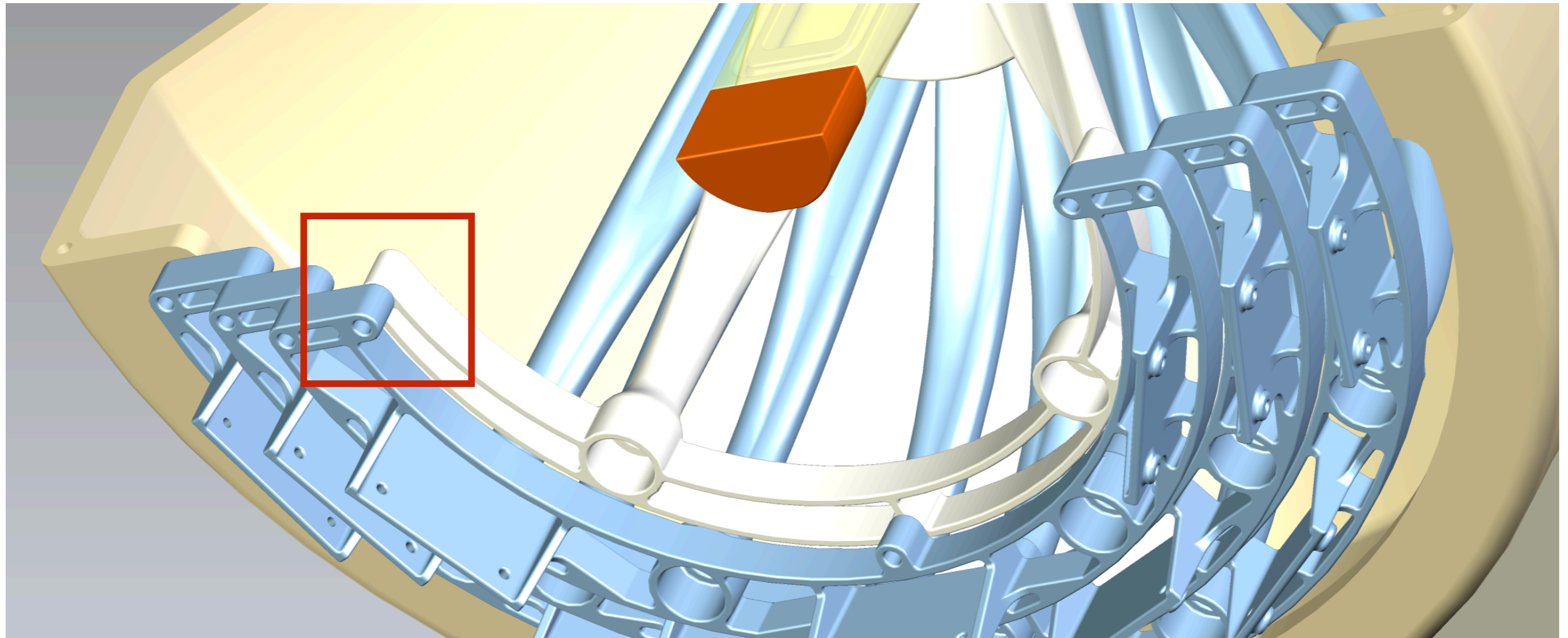


2) AIR DUCTS



If no update from Gael, proposed solution is to keep fixed internal dimension and make thicker wall from external side, filling the missing volume.

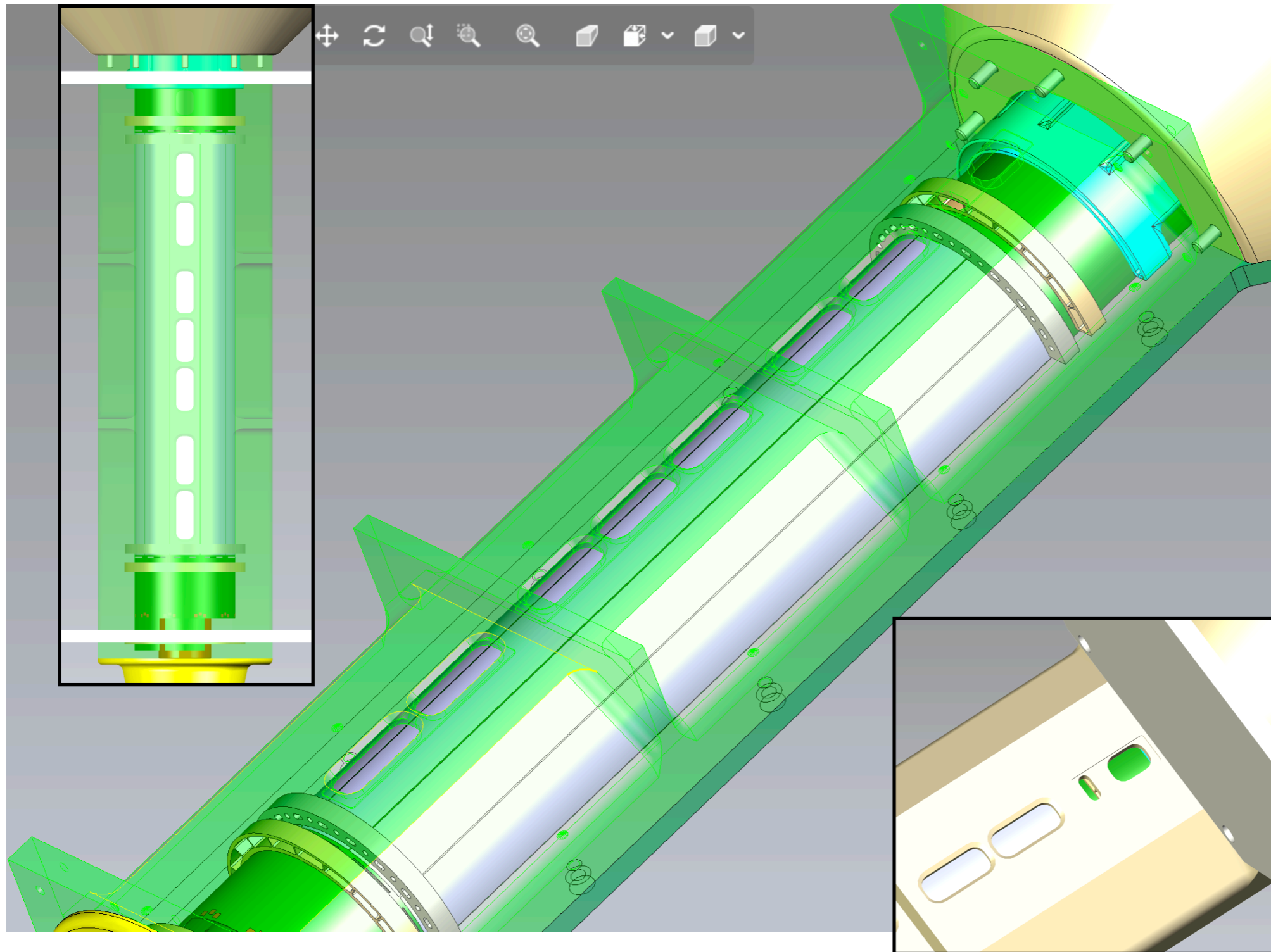
3) AIR DUCTS CONNECTION TO THE SHELLS



Can you give us details about the connection between the end of air ducts and the patch panel?

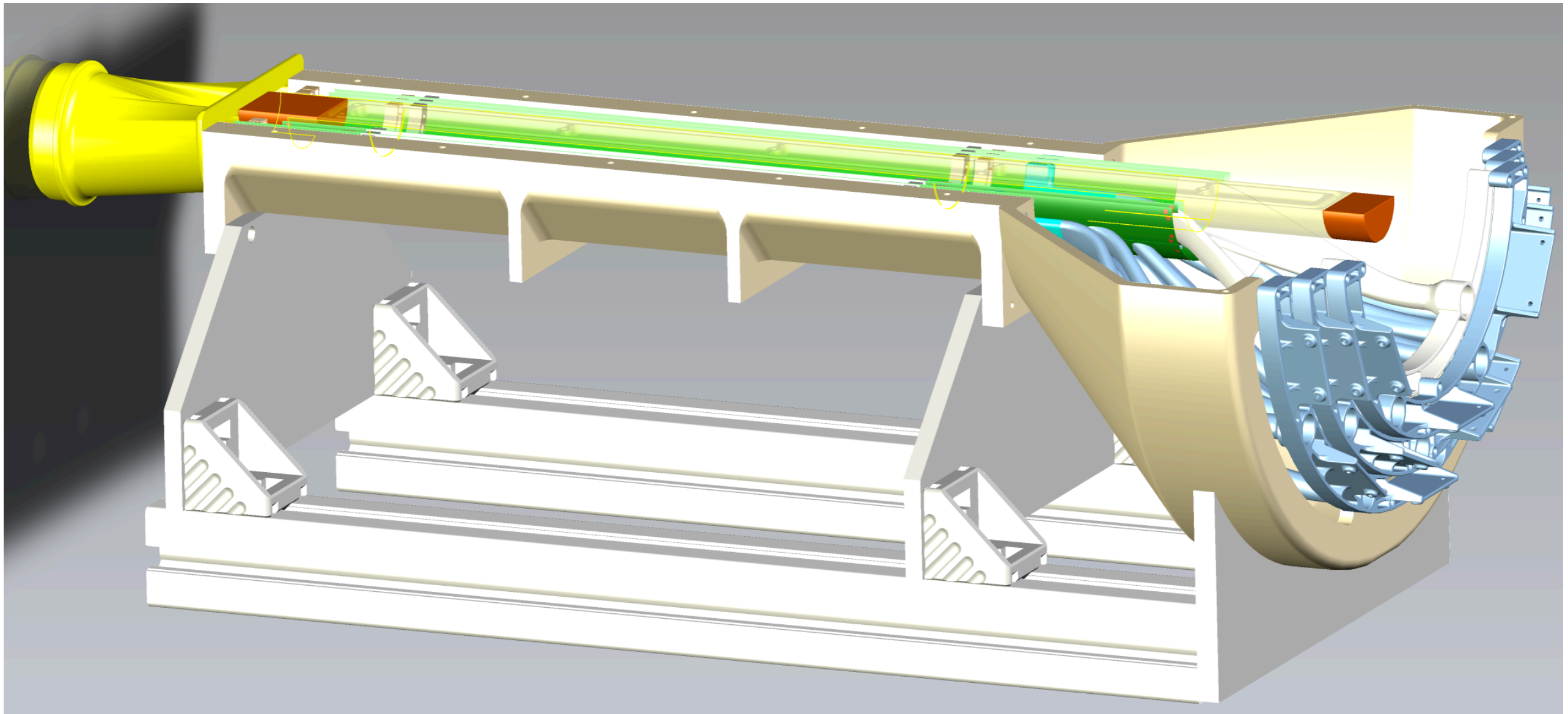
Do we actually need to have the patch panel?

4) WINDOWS POSITION IN THE CYSS

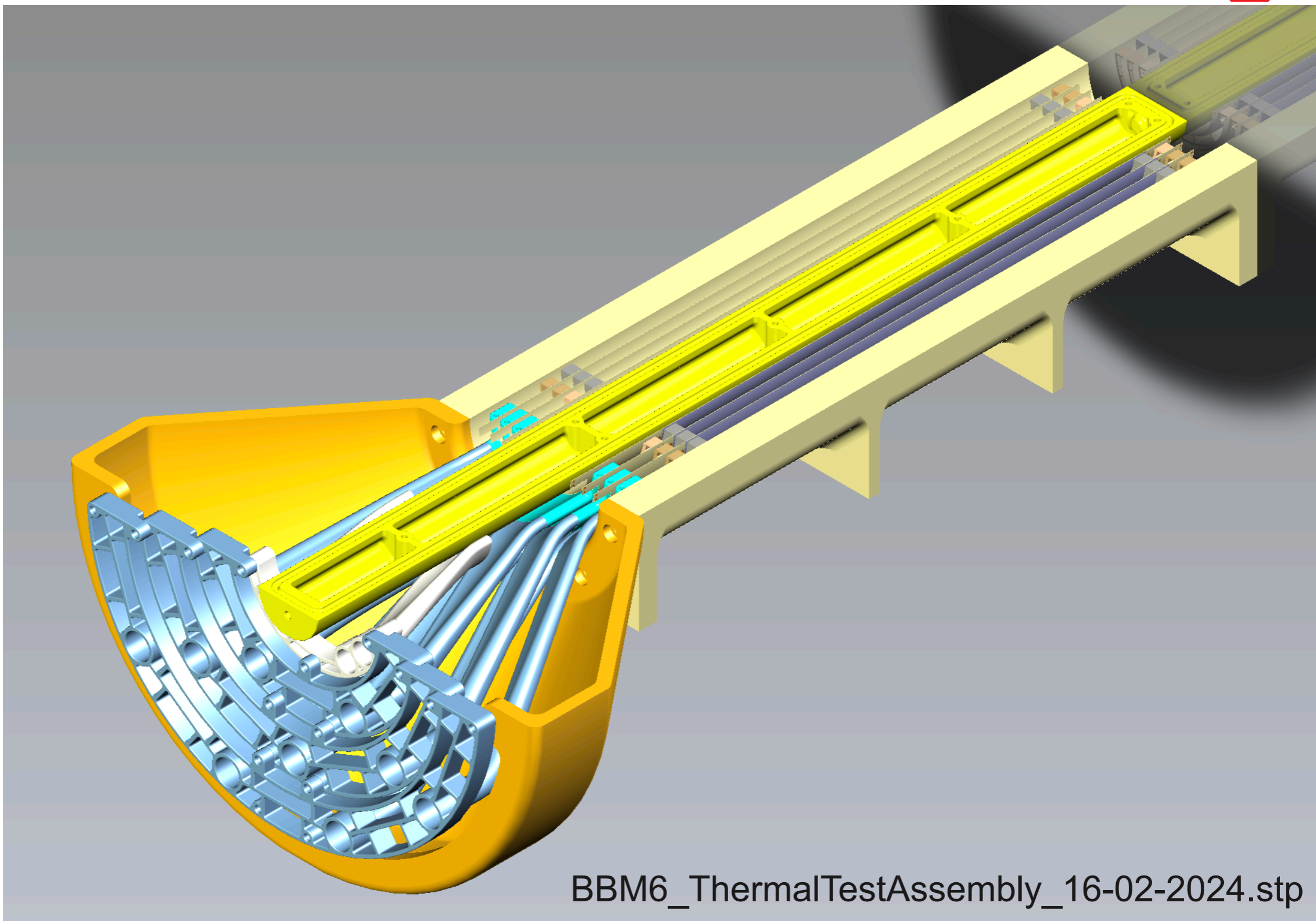


All the windows positioned in the agreed places

5) SUPPORT STRUCTURE

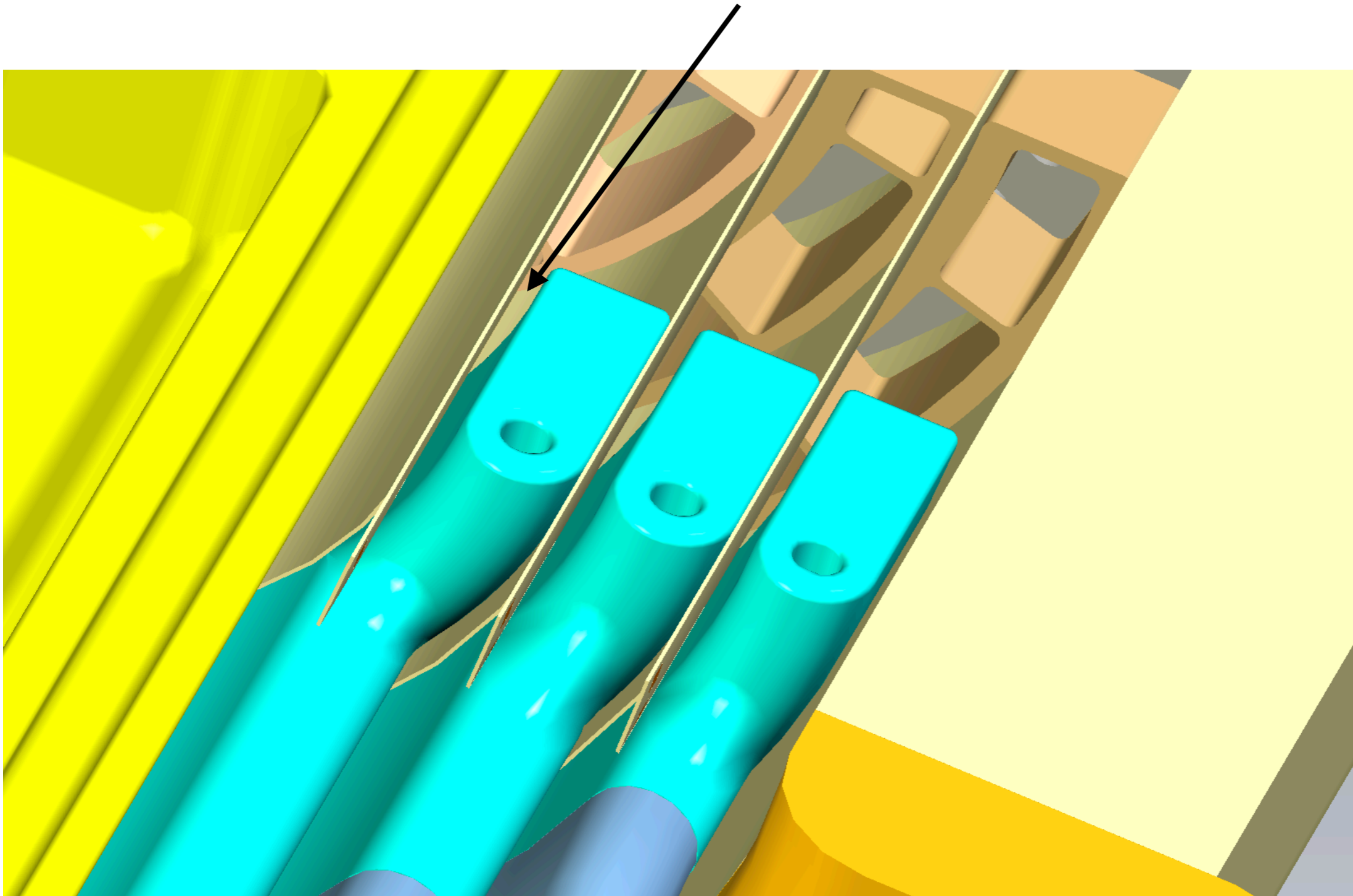


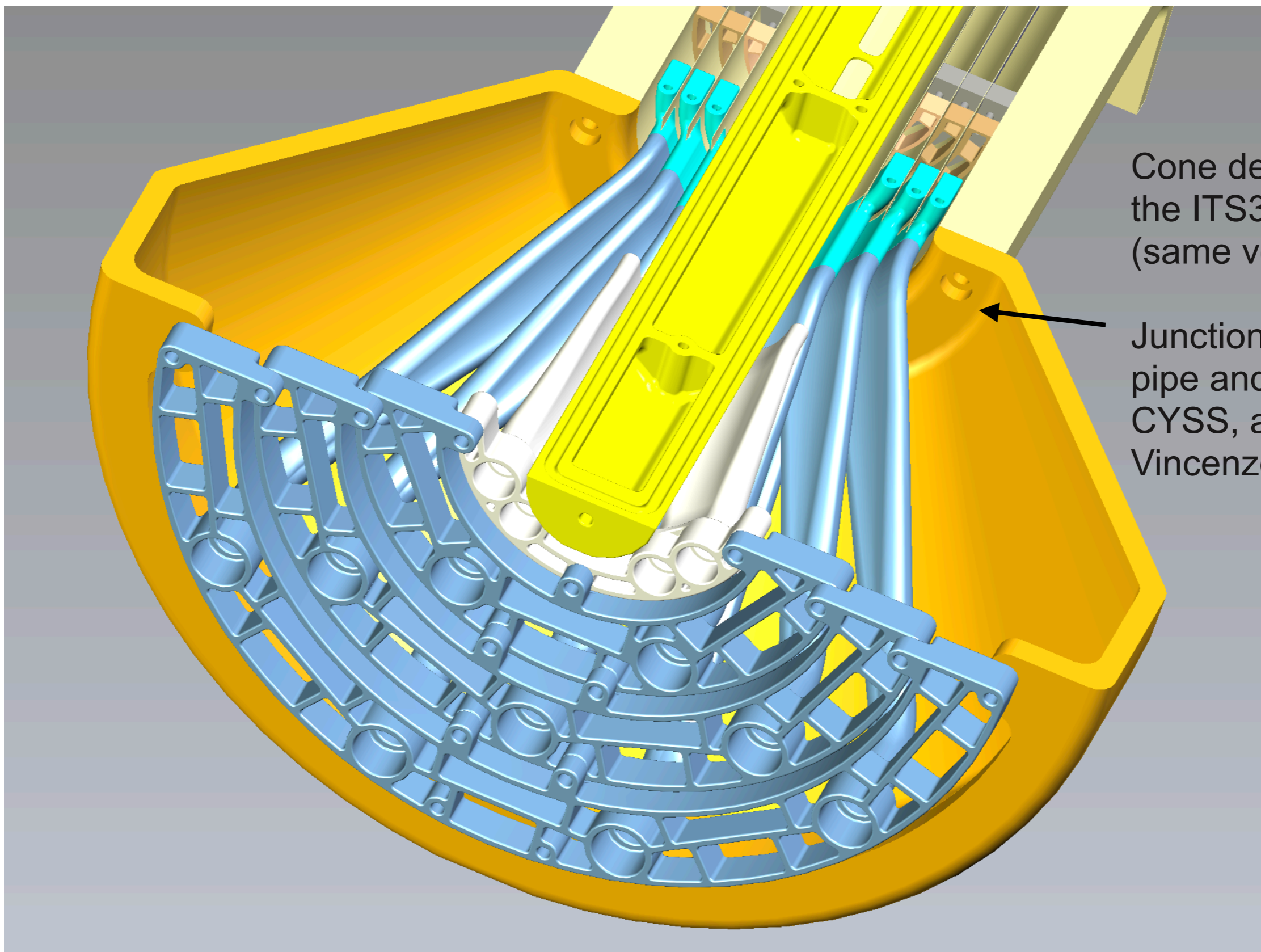
Is this solution compatible with wind tunnel?



BBM6_ThermalTestAssembly_16-02-2024.stp

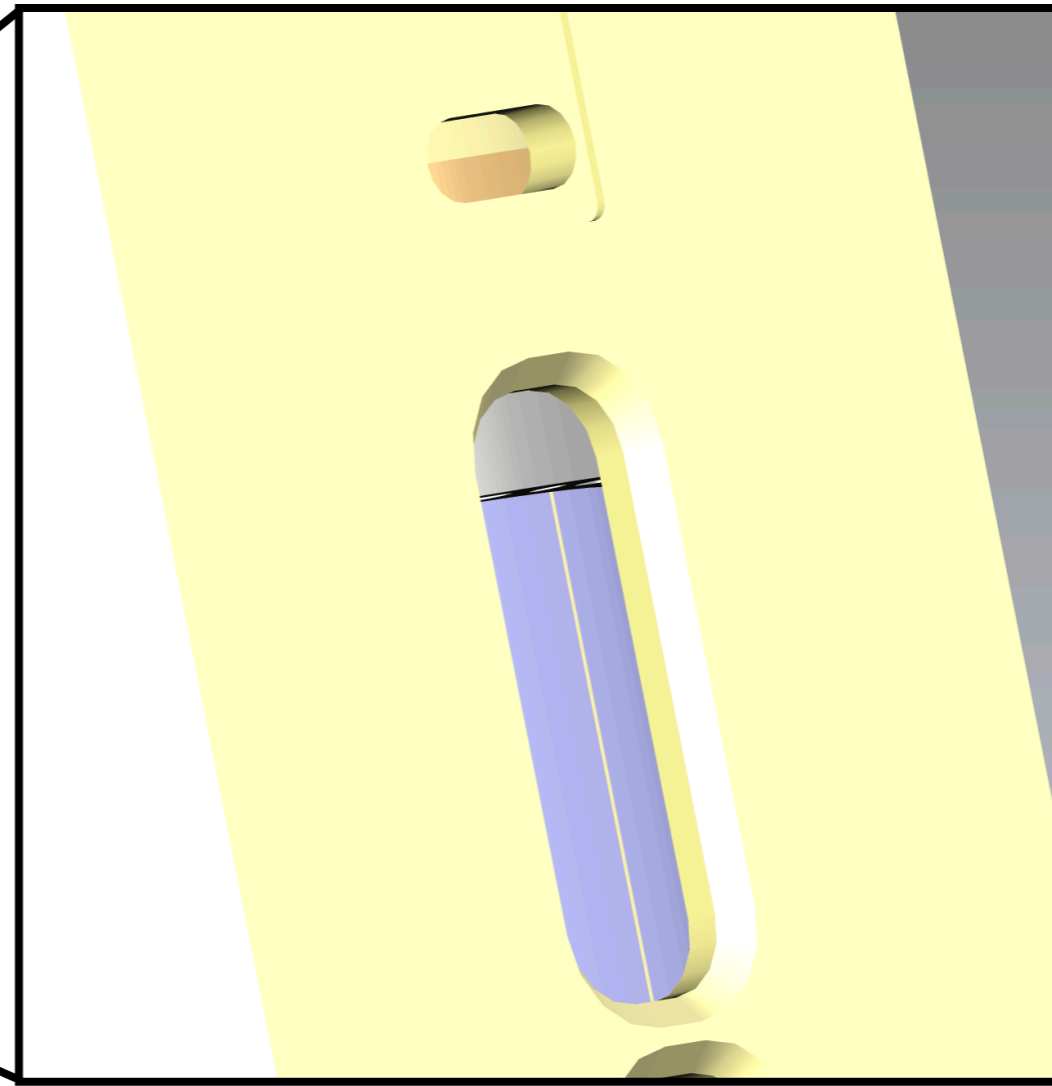
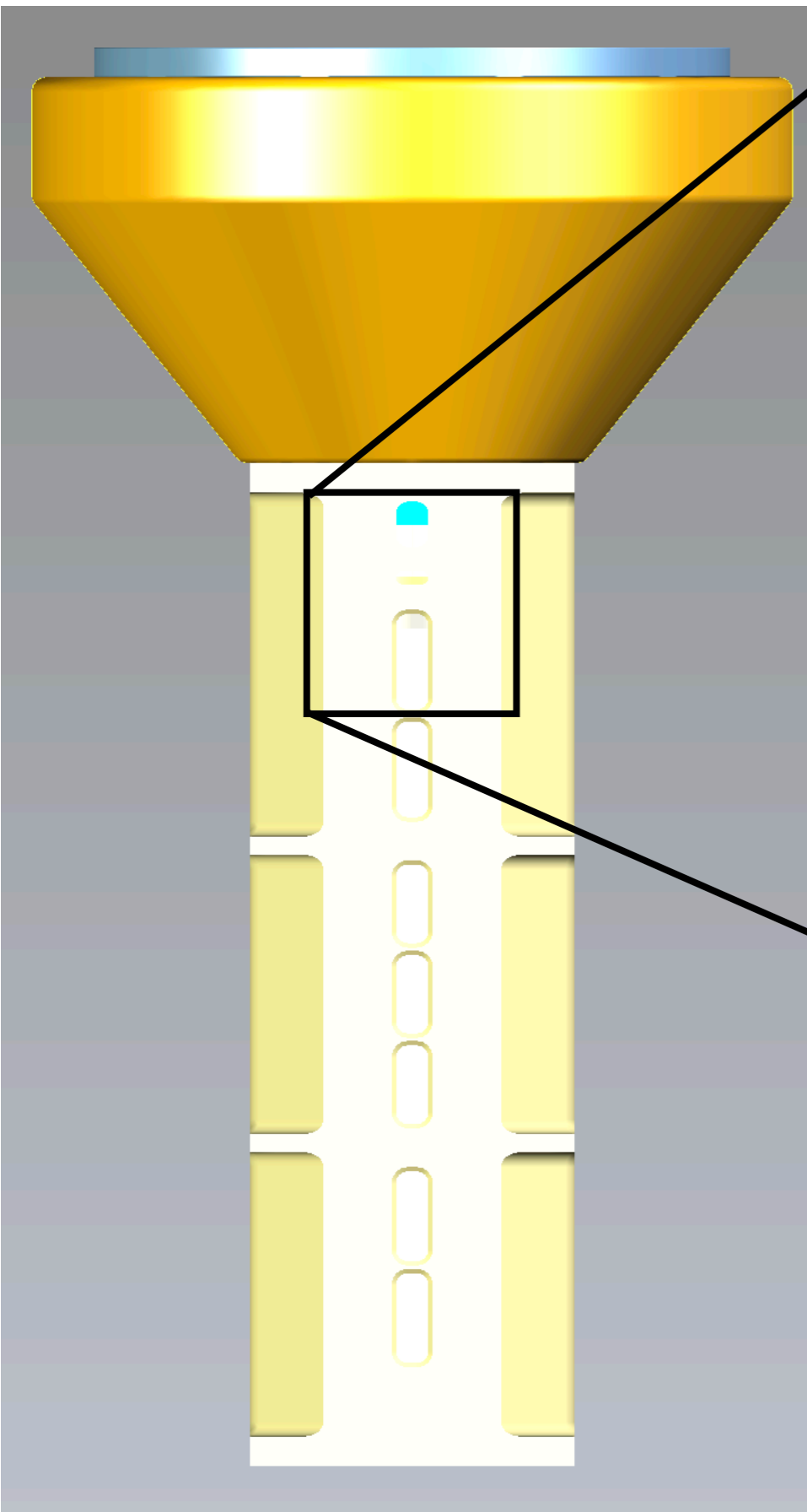
Changing layers radii and layers separation distance the cooling pipe thicknesses need to be adjusted



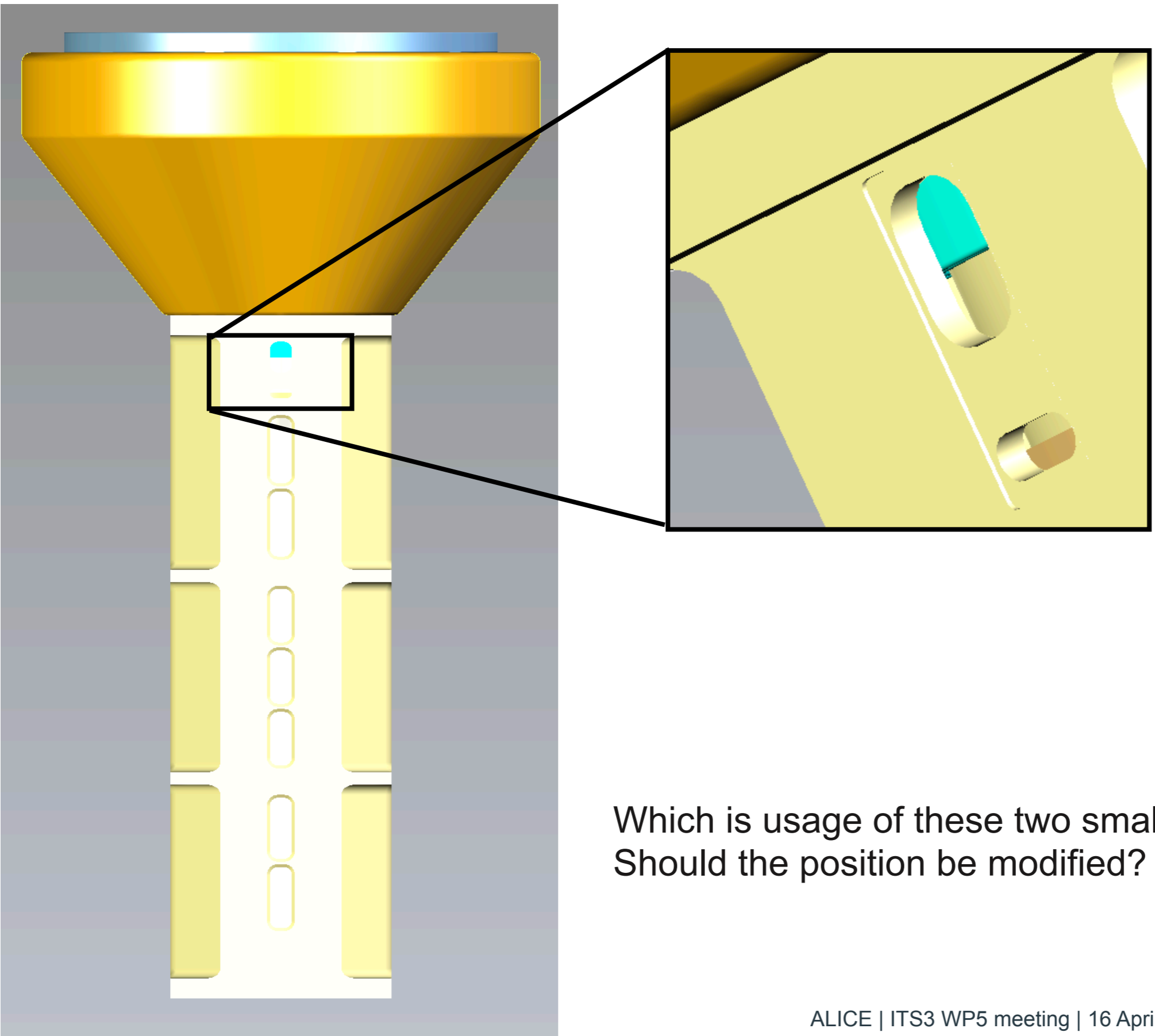


Cone design based on the ITS3 cone model (same volume).

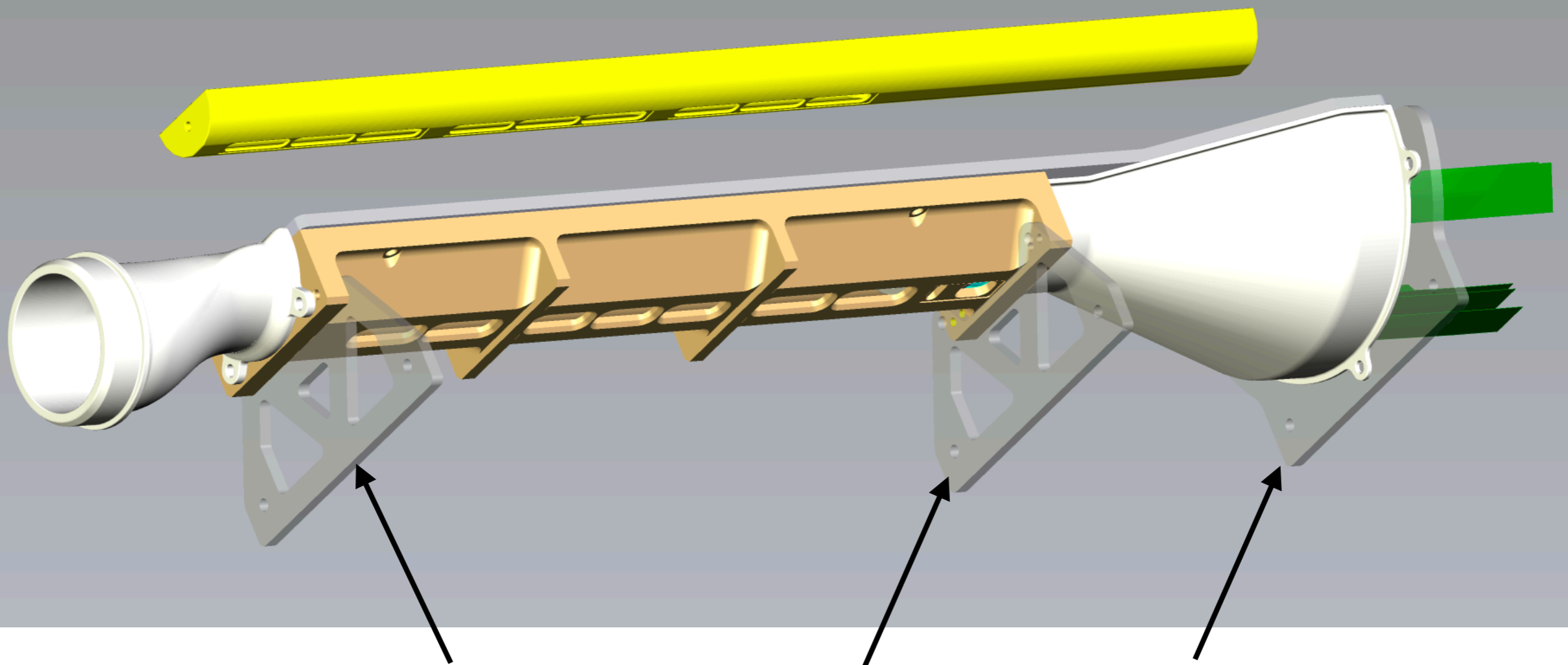
Junctions to the cooling pipe and specific CYSS, added by Vincenzo.



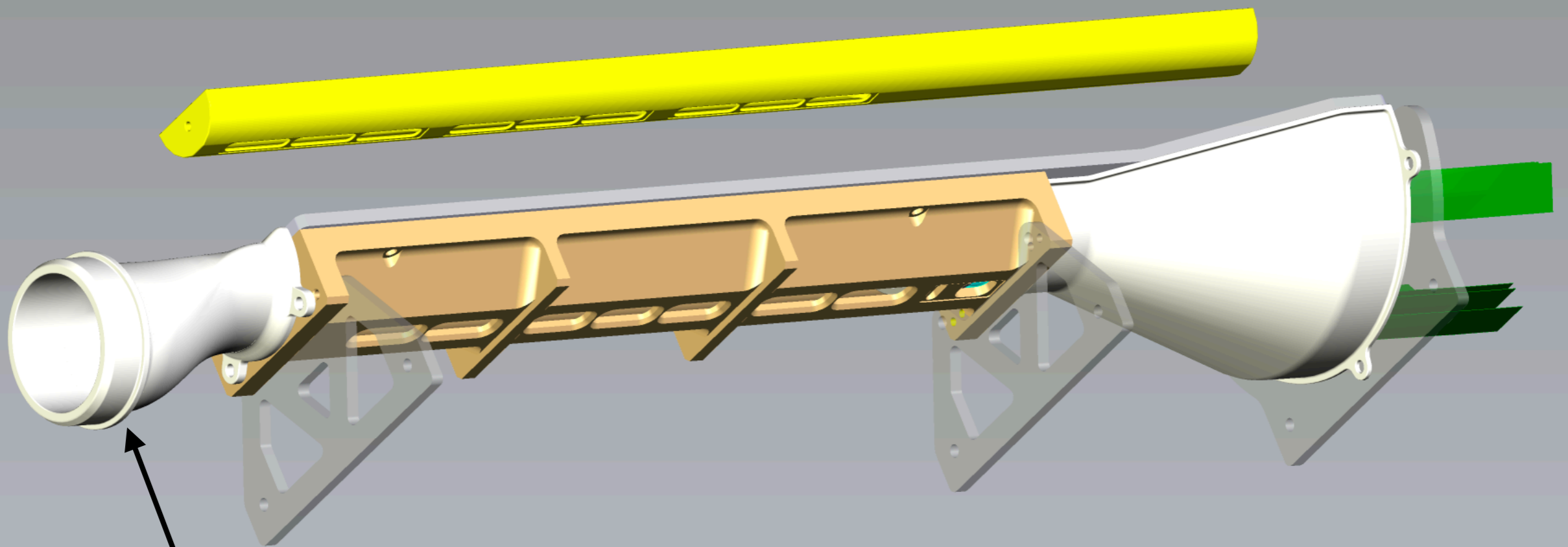
- Dimensions and positions of the big openings have been respected.
- Position of the first one interfere with the below half-ring.
- True also for the small window above interfering with service half-ring.



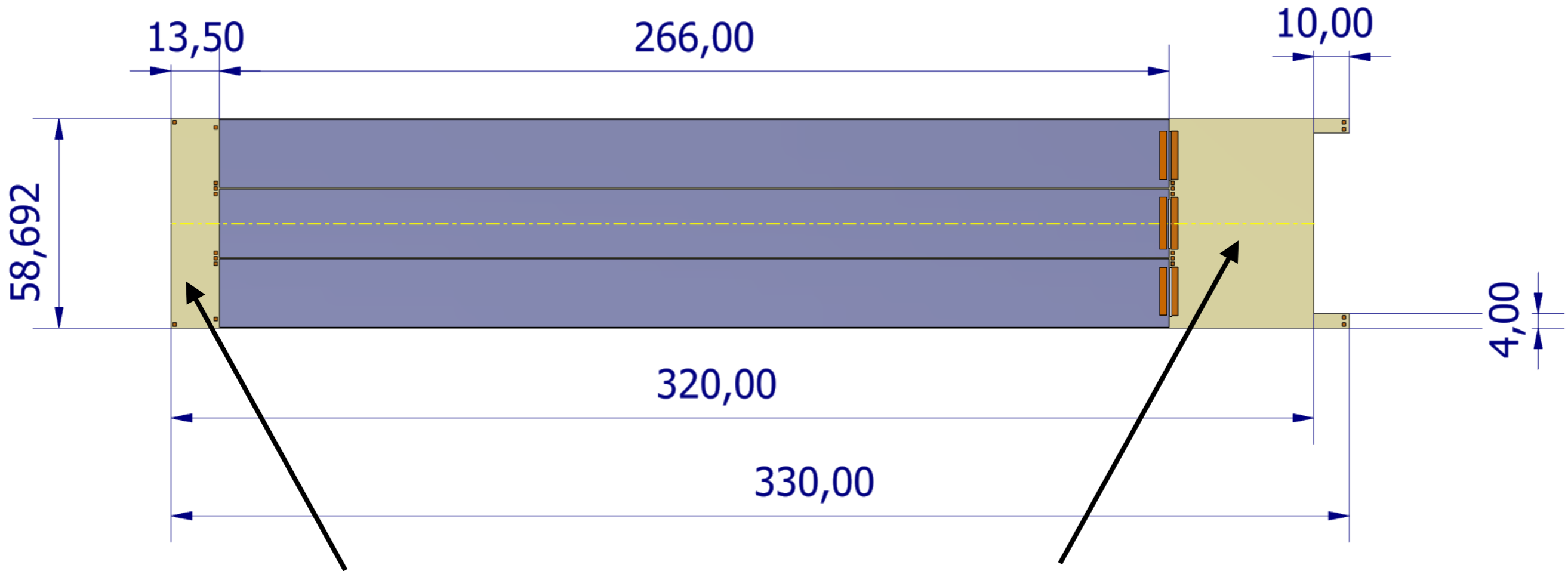
Which is usage of these two smaller windows?
Should the position be modified?



Are these supports used?
The holes in the bottom part of the supports have a special meaning and should be kept?



This needs to be redesigned.
Should we do it or you prefer to implement special constrains?
I assume that the diameter of the output should be kept.



Maybe question to Rui/Serge.

Total thickness in the sensor region 160 um, from Massimo's slides.

What would be the thickness in the region without sensor?

Should we look for a thickness close to the FPC one?

