Updates on RPC first slot of intervention: RE3/1 installation

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RPC TC working meeting , February 2017

Plan

- Results of measurements of value “Z” for RE3/1;
- Fastening elements for fixing RE3/1 chambers on the YE3;
- Studies of the value “Z” for RE4/1;
- Mounting frames for RE4/1 chambers ;
- The proposal about mounting of the frames using mounting posts M24 (outer “R”)

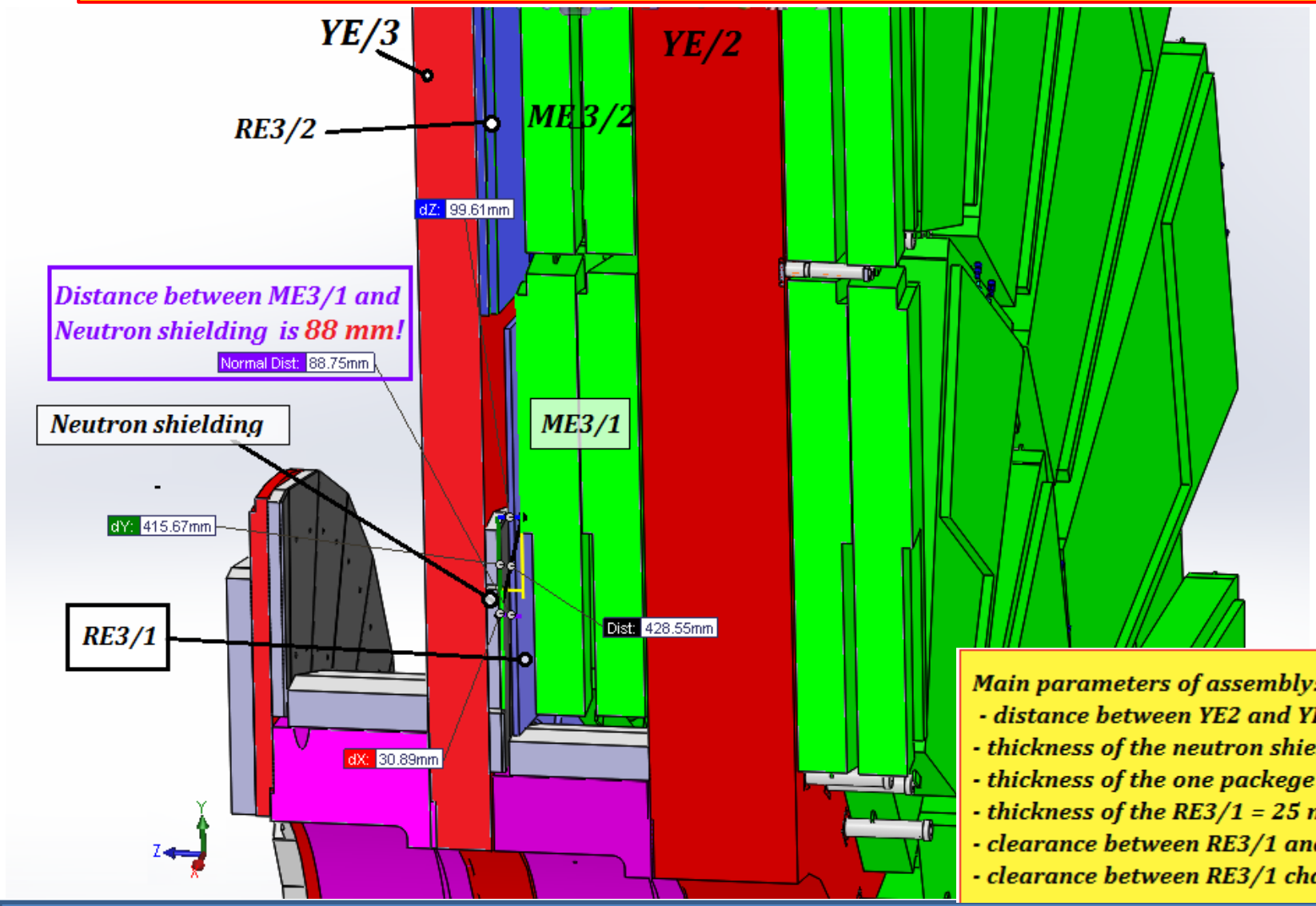
Four methods to determine the value "Z" for RE3/1

1. Main drawing of the CMS;
2. Manual measurements;
3. Laser scanner and laser tracker;
4. IR - sensors.

The value "Z" for RE3/1

1. Main drawing

➢ **On basis the main drawing of the CMS the value "Z" for RE3/1 is 88 mm!**



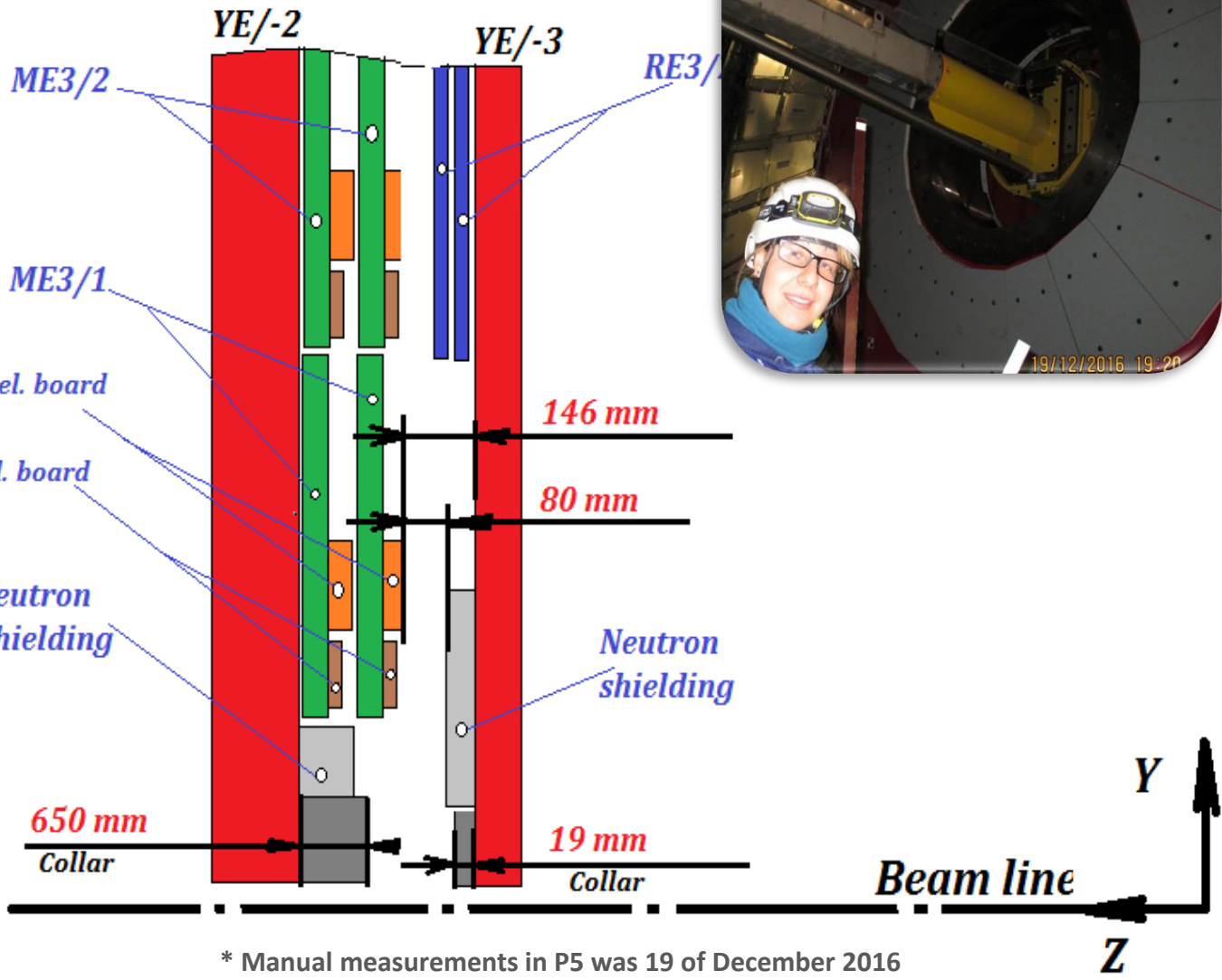
Main parameters of assembly:
- *distance between YE2 and YE3 = 655 mm;*
- *thickness of the neutron shielding = 63 mm;*
- *thickness of the one packege of CSC = 504 mm;*
- *thickness of the RE3/1 = 25 mm;*
- *clearance between RE3/1 and shielding =5 mm;*
- *clearance between RE3/1 chambers = 5 mm.*

2. Manual measurements

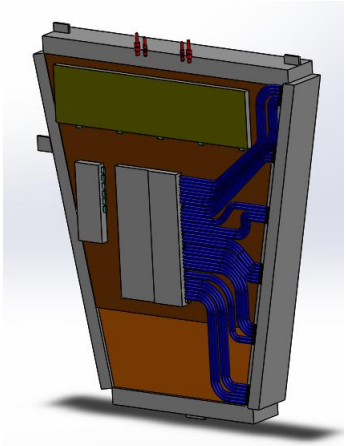
The value "Z" for RE3/1

➢ **The value "Z" for RE3/1 from manual measurements is 80 mm!**

Principle scheme for determination the value "Z "



*** The features design of the CSC chamber were taken into account.**

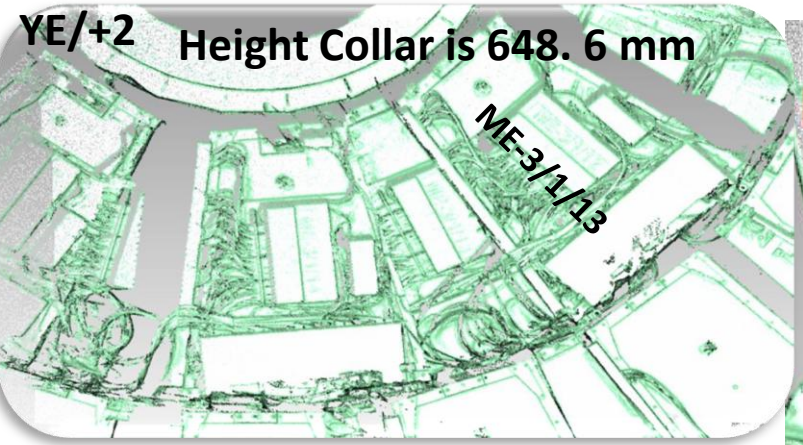


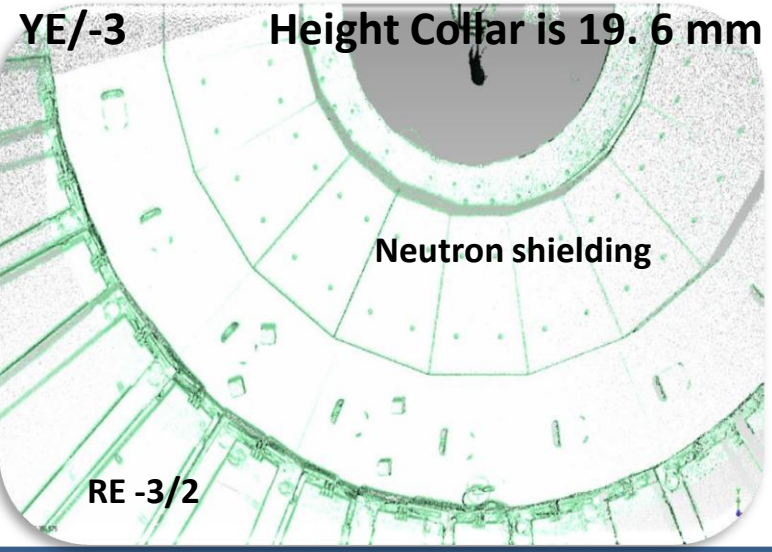
* Manual measurements in P5 was 19 of December 2016

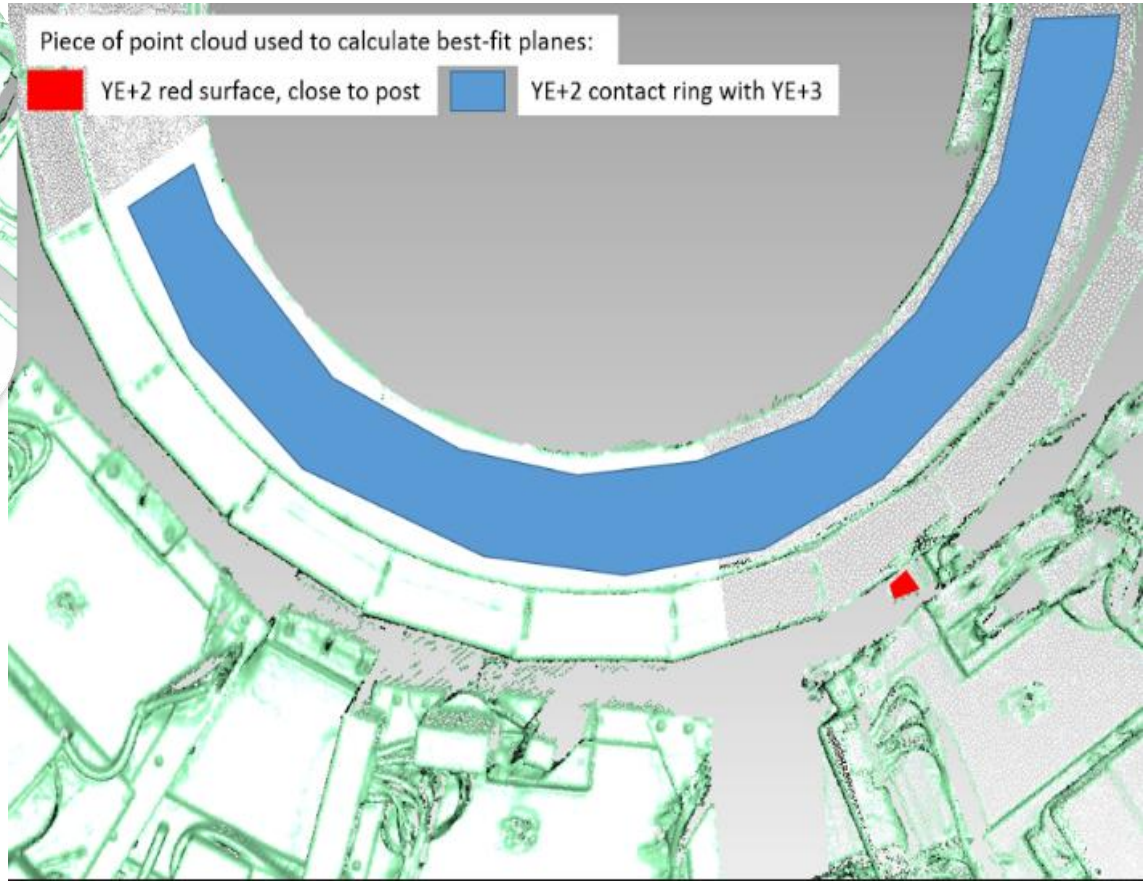
The value "Z" for RE3/1

3. Laser scanner and laser tracker

** Laser scanning in P5 was done 19 of December 2016 (for YE-2 and YE-3 around the ME-3/1/13) and 10 of January 2017 (for YE+2 and YE+3 around the ME+3/1/13)*







The value "Z" for RE3/1

Main results from laser scanner :

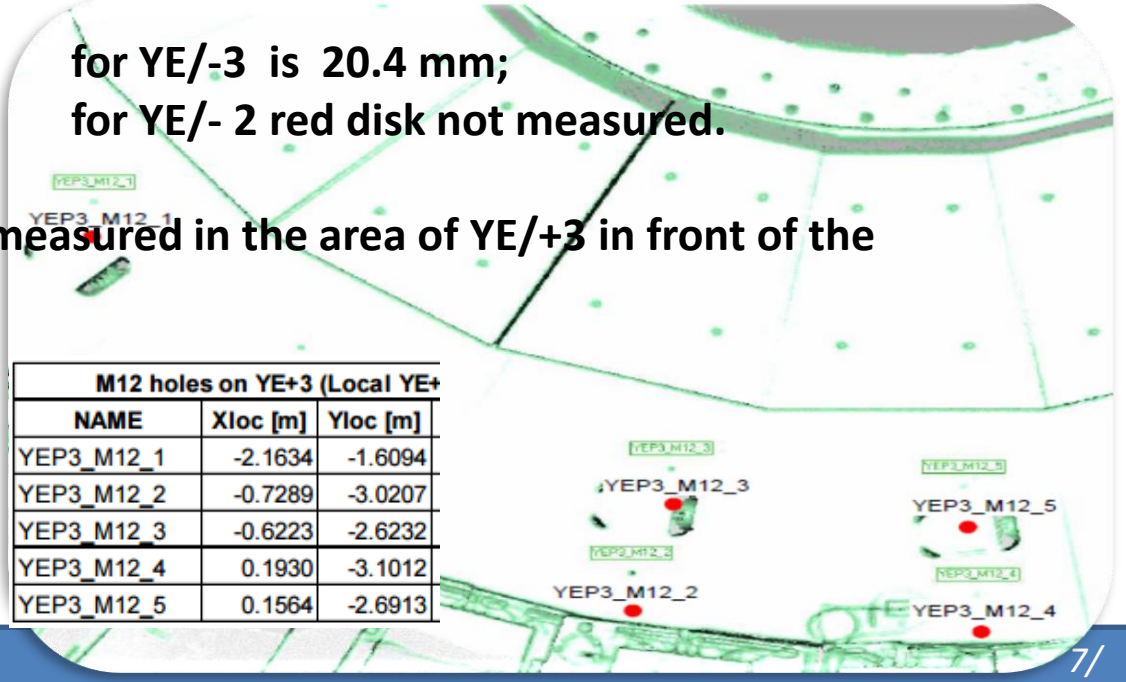
- **Surfaces between YE-2 / / YE+2 and YE-3// +3 around the CSC chambers ME/-3/1/13 // ME/+3/1/13 (below the beam pipe on far side) have been measured;**
- **The topology of CSC chambers is determined very good;**
- **The average error of the best-fit is :**

  for YE/-2 and YE/-3 is +/-1.8 mm;
  for YE/+2 and YE/+3 is +/-3.0 mm.
- **The maximum error is :**

  for YE/-2 and YE/-3 is +/-2.5 mm;
  for YE/+ 2and YE/+3 is +/-3.0 mm.
- **The height of the collars are:**

  for YE/+3 is 19.6 mm; for YE/-3 is 20.4 mm;
  for YE/+ 2 is 648.6 mm; for YE/- 2 red disk not measured.
- **The position of five M12 holes measured in the area of YE/+3 in front of the CSC chamber ME+3/1/13.**

M12 holes on YE+3 (Local YE+		
NAME	Xloc [m]	Yloc [m]
YEP3_M12_1	-2.1634	-1.6094
YEP3_M12_2	-0.7289	-3.0207
YEP3_M12_3	-0.6223	-2.6232
YEP3_M12_4	0.1930	-3.1012
YEP3_M12_5	0.1564	-2.6913



The value "Z" for RE3/1

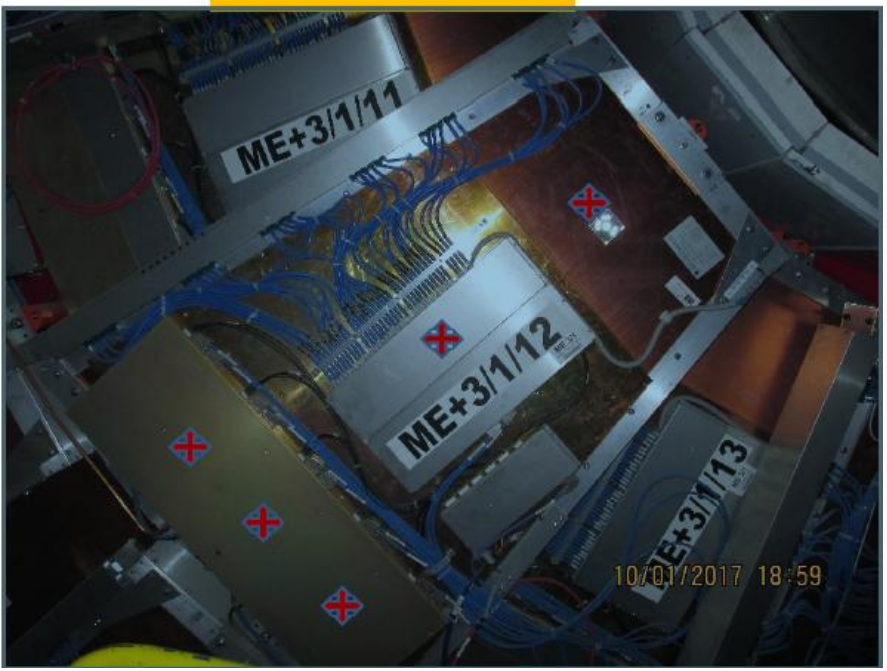
4. IR sensors

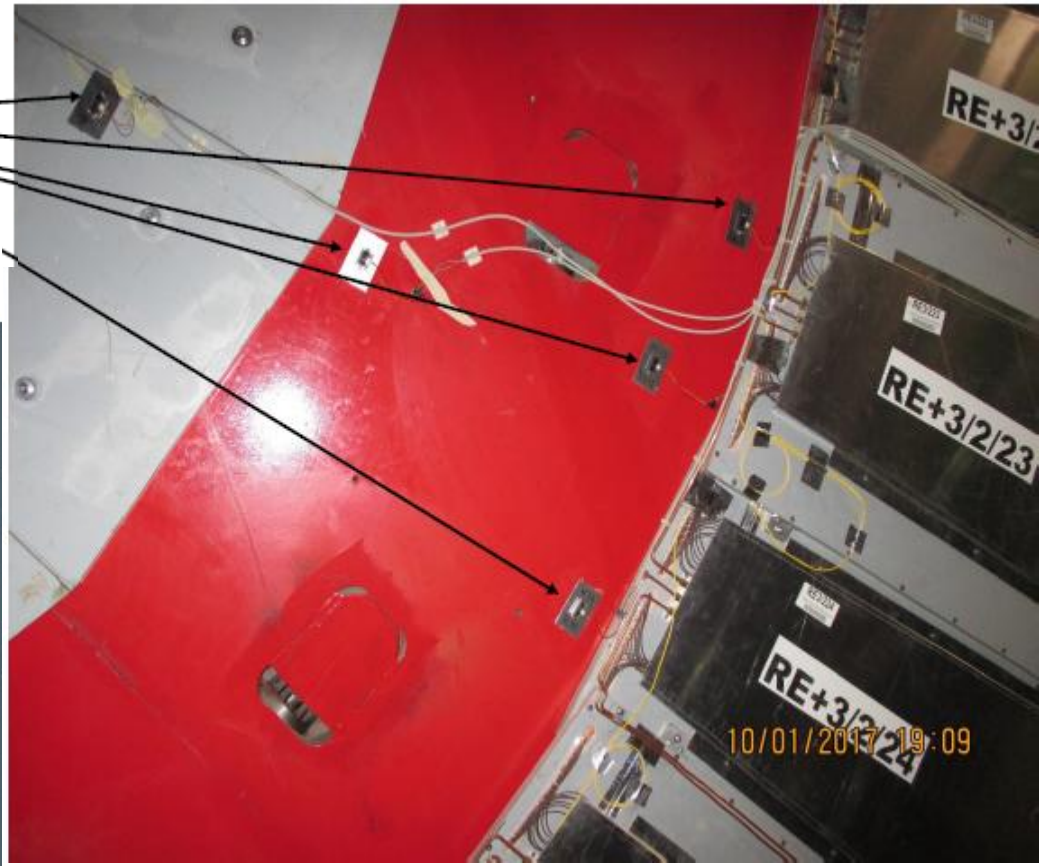
* IR sensors were installed in 10th of January 2017

➢ **Results will be come later after closing YE/+2 and YE/+3.**

IR sensors with individual shielded cable

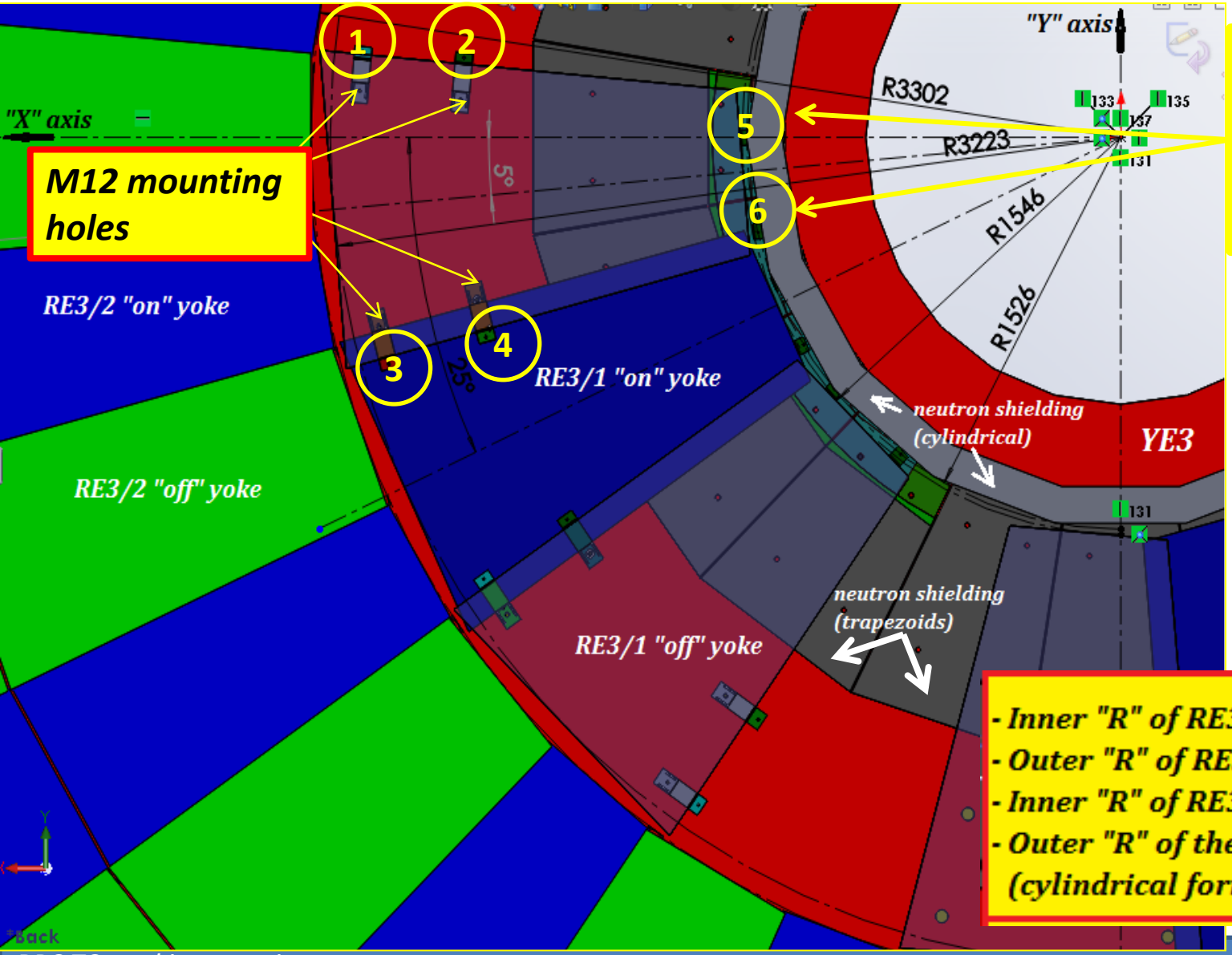
Target areas





Fastening elements for fixing RE3/1 chambers on the YE3

1. Mounting of the RE 3/1 chambers on the YE3

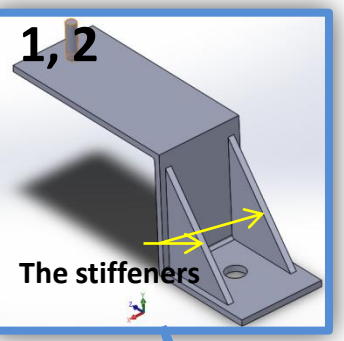


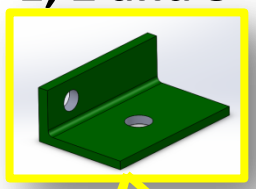
Each RE3/1 chamber is fixed in the six points

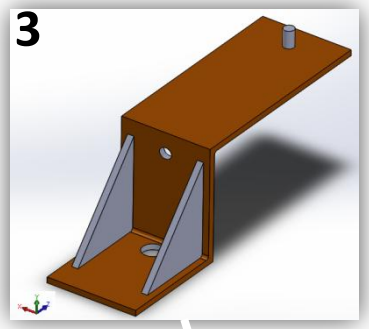
- Inner "R" of RE3/2 is 3302 mm;
- Outer "R" of RE31 is 3223 mm;
- Inner "R" of RE3/1 is 1546 mm;
- Outer "R" of the neutron shielding (cylindrical form) is 1526 mm .

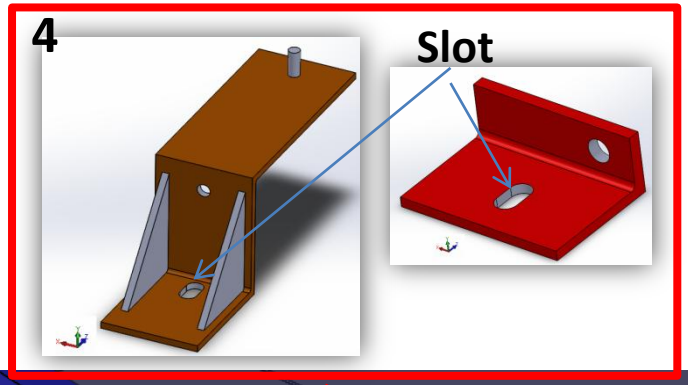
Fastening elements for fixing RE3/1 chambers on the YE3

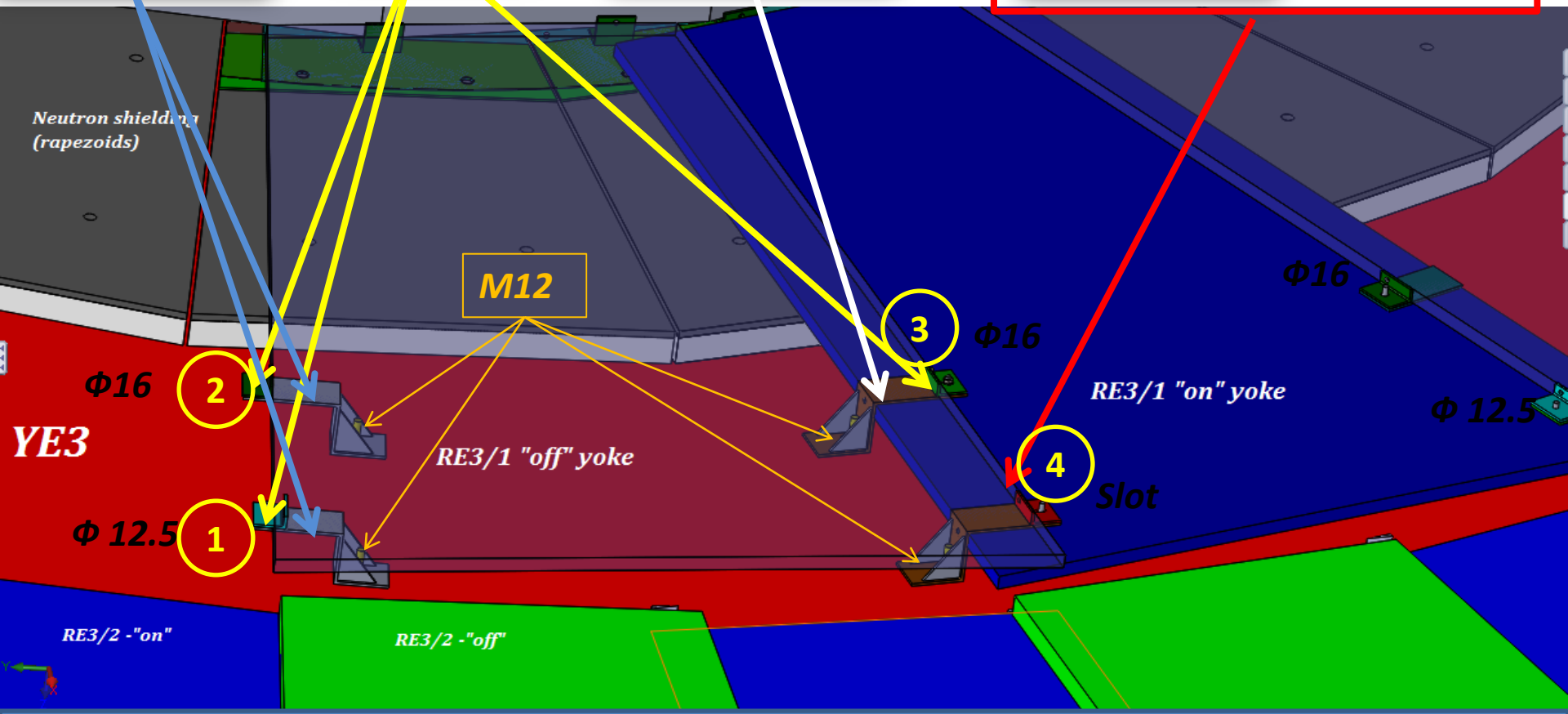
2. Mounting brackets for the RE 3/1 chambers





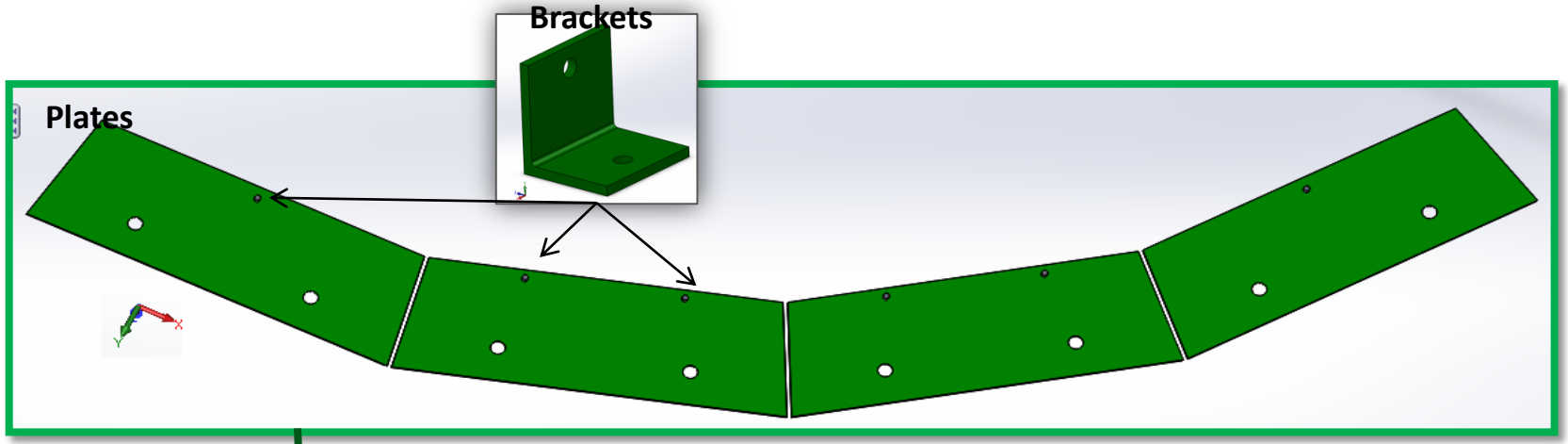


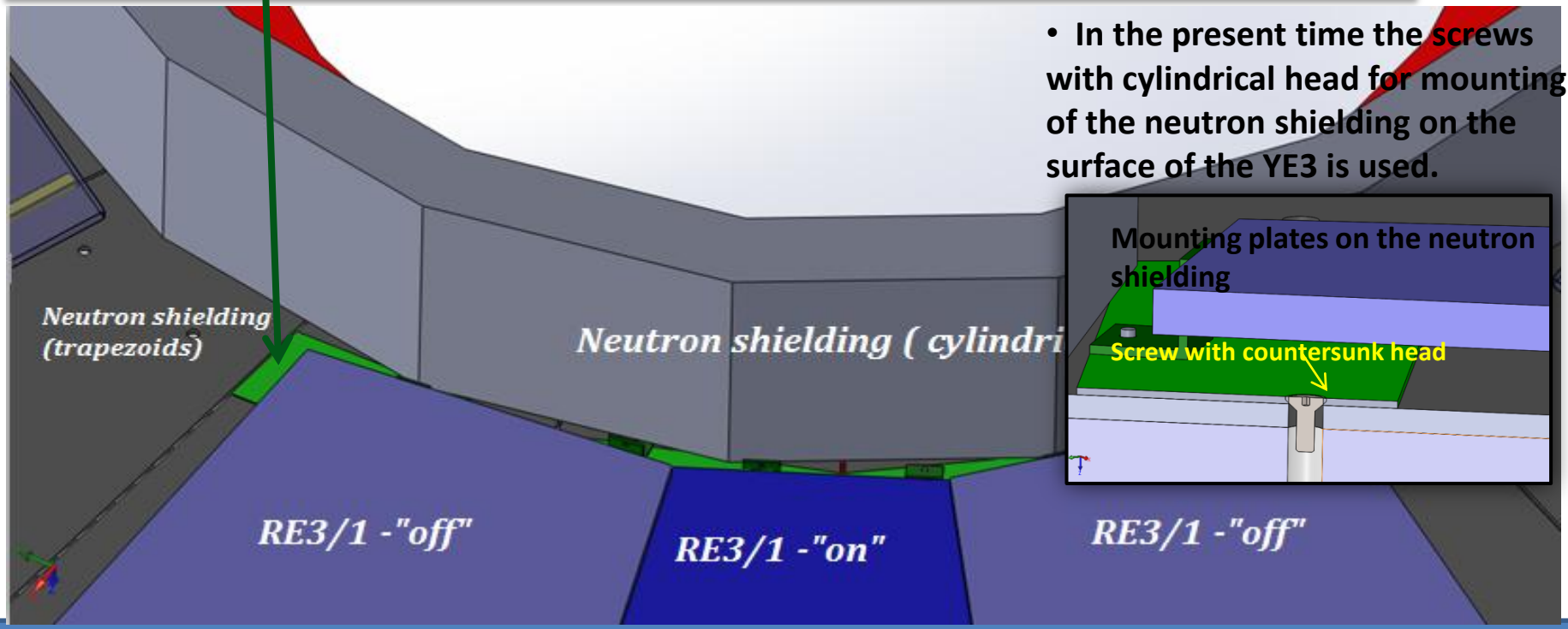




Fastening elements for fixing RE3/1 chambers on the YE3

3. Mounting plates for the RE 3/1 chambers





- In the present time the screws with cylindrical head for mounting of the neutron shielding on the surface of the YE3 is used.

Studies of the value “Z” for RE4/1

Available space for RE4/1 chambers

- **On basis the main drawing of the CMS the value "Z" for RE4/1 is 85 mm.**
- **Perhaps in the real live the available space for RE4/1 chambers is about 80 mm.**

It isn’t enough!

Because:

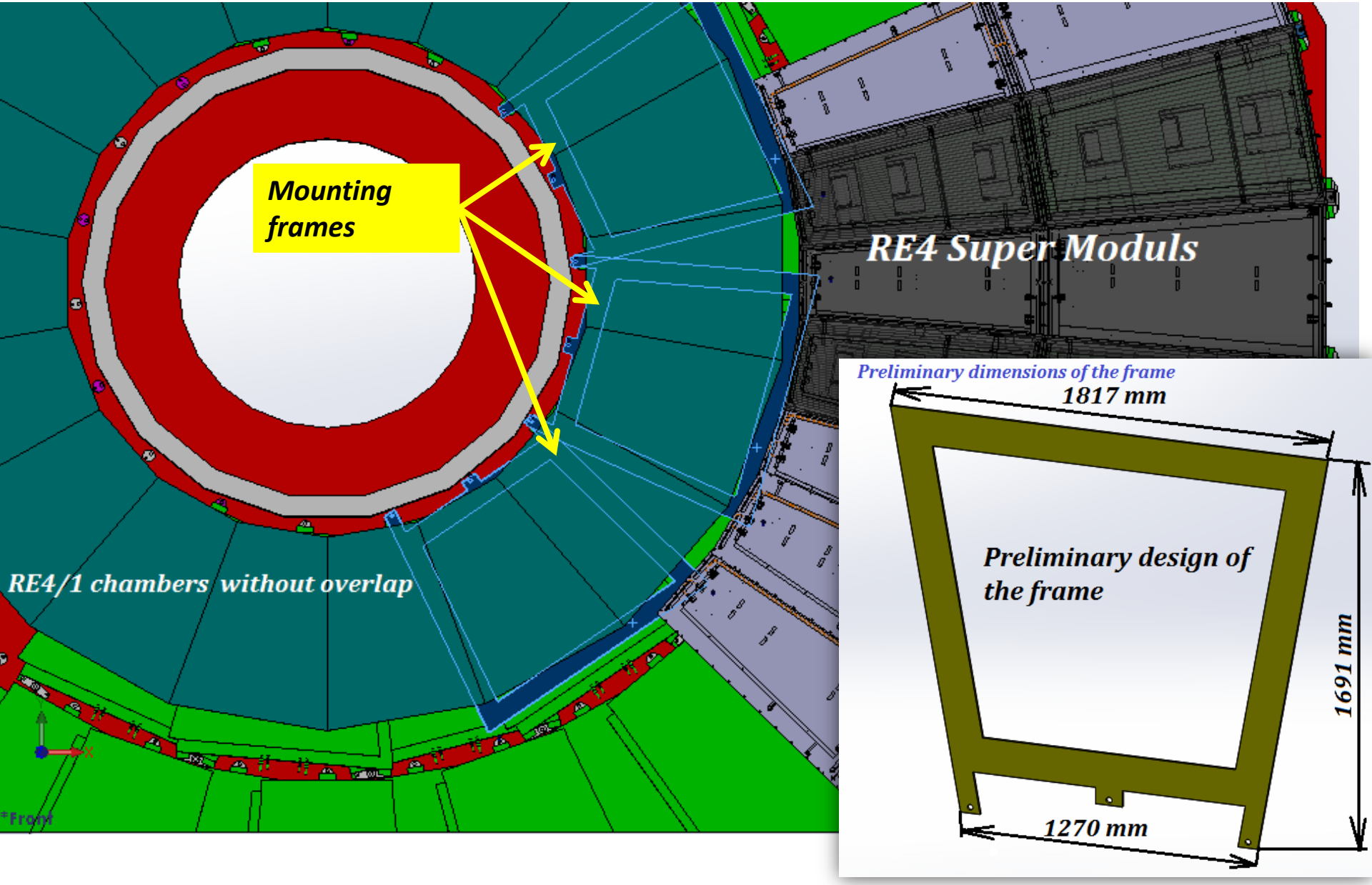
The space between ME4/1 and RE4/1 is about 15 mm or 20 mm;
Thickness of the RE4/1 “on” yoke is 25 mm;
Thickness of the RE4/1 “on” yoke is 25 mm;
The value gap is 5mm;
Thickness Alu mounting plates is 8 mm.

_____

Total: 83 mm.

Thus, we have the available space for RE4/1 chambers without overlap!

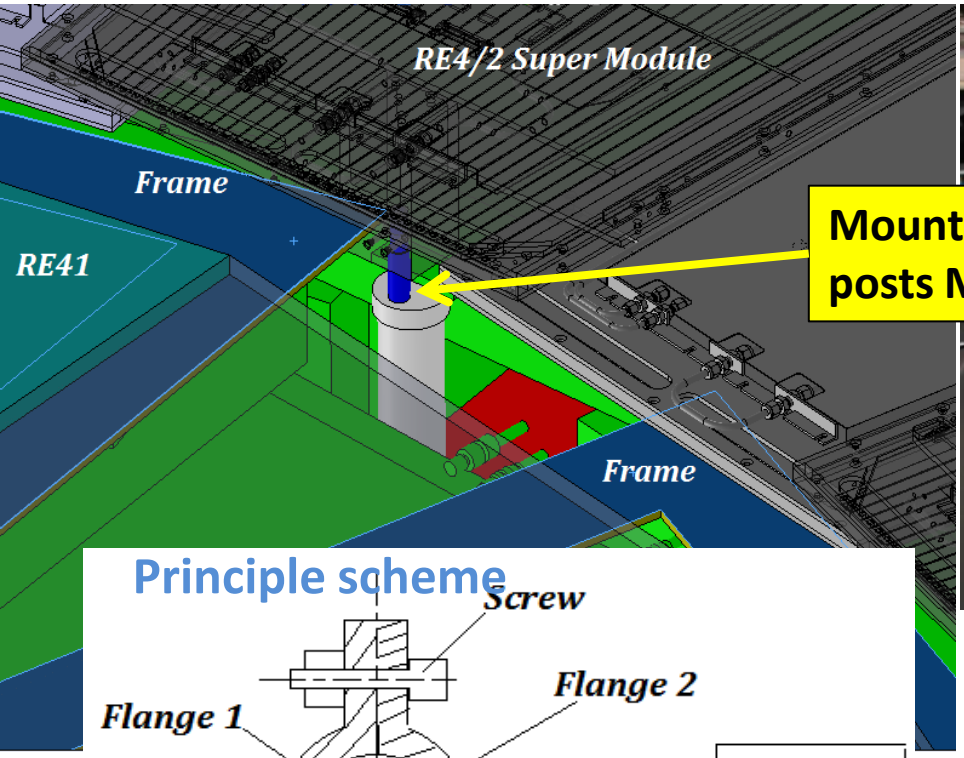
Mounting frames for RE4/1 chambers

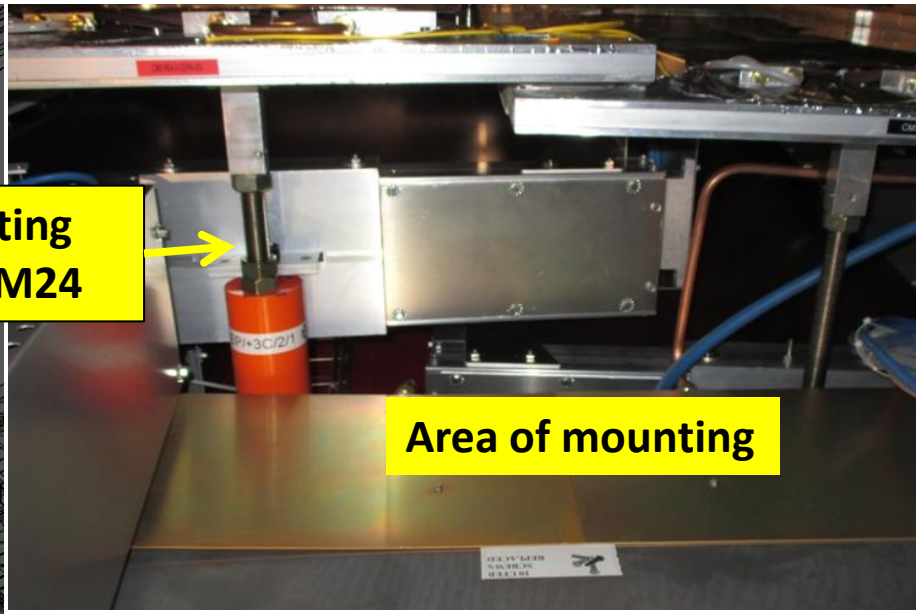


The proposal about mounting of the frames using mounting posts M24 (outer “R”)

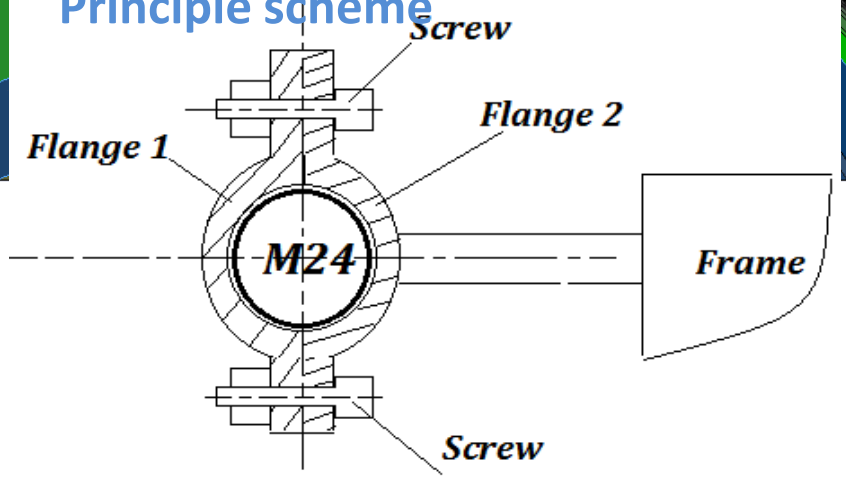
Two interesting questions:

1. **How to mount the frame using the mounting positions M24?**
2. **How to attach the RE4/1 chambers on the frames?**

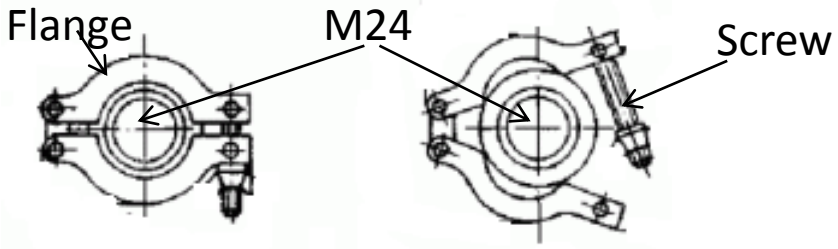




Principle scheme



Or another version



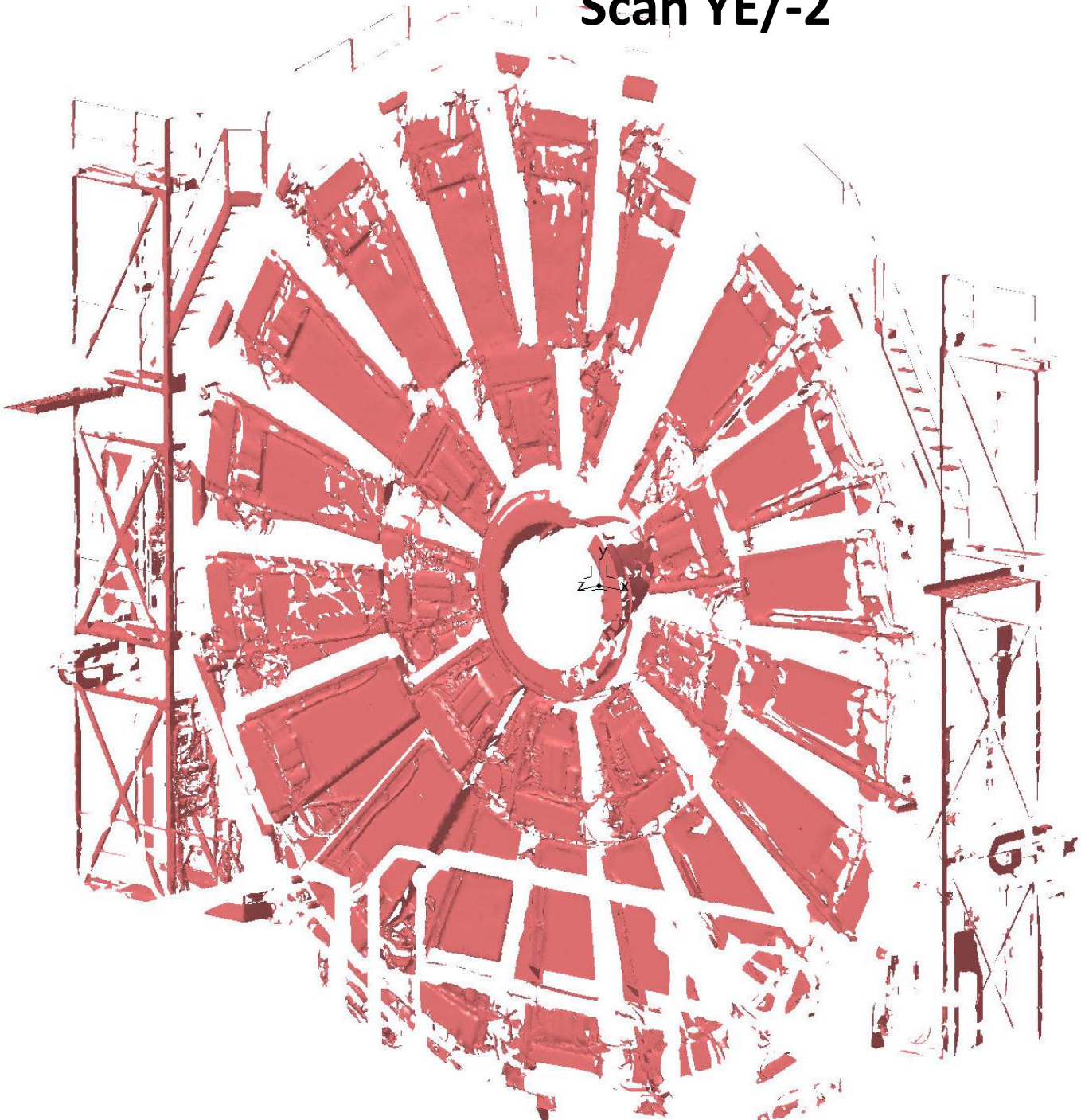
Conclusion

- **On the basis all received results we have the value “Z” for RE3/1 chambers 80 mm;**
- **The RE3/1 chambers brackets and mounting plates for fixing were produced;**
- **The drawings for brackets and mounting plates will be done in the end this week (Tuesday or Friday will be done);**
- **Next step will be study the mounting FEBs on the RE3/1 chambers;**
- **The available space for RE4/1 chambers is about 80 mm. It isn’t enough for RE4/1 chambers with overlap;**
- **The mounting RE4/1 chambers frames were proposed (this exercise is going to be done).**

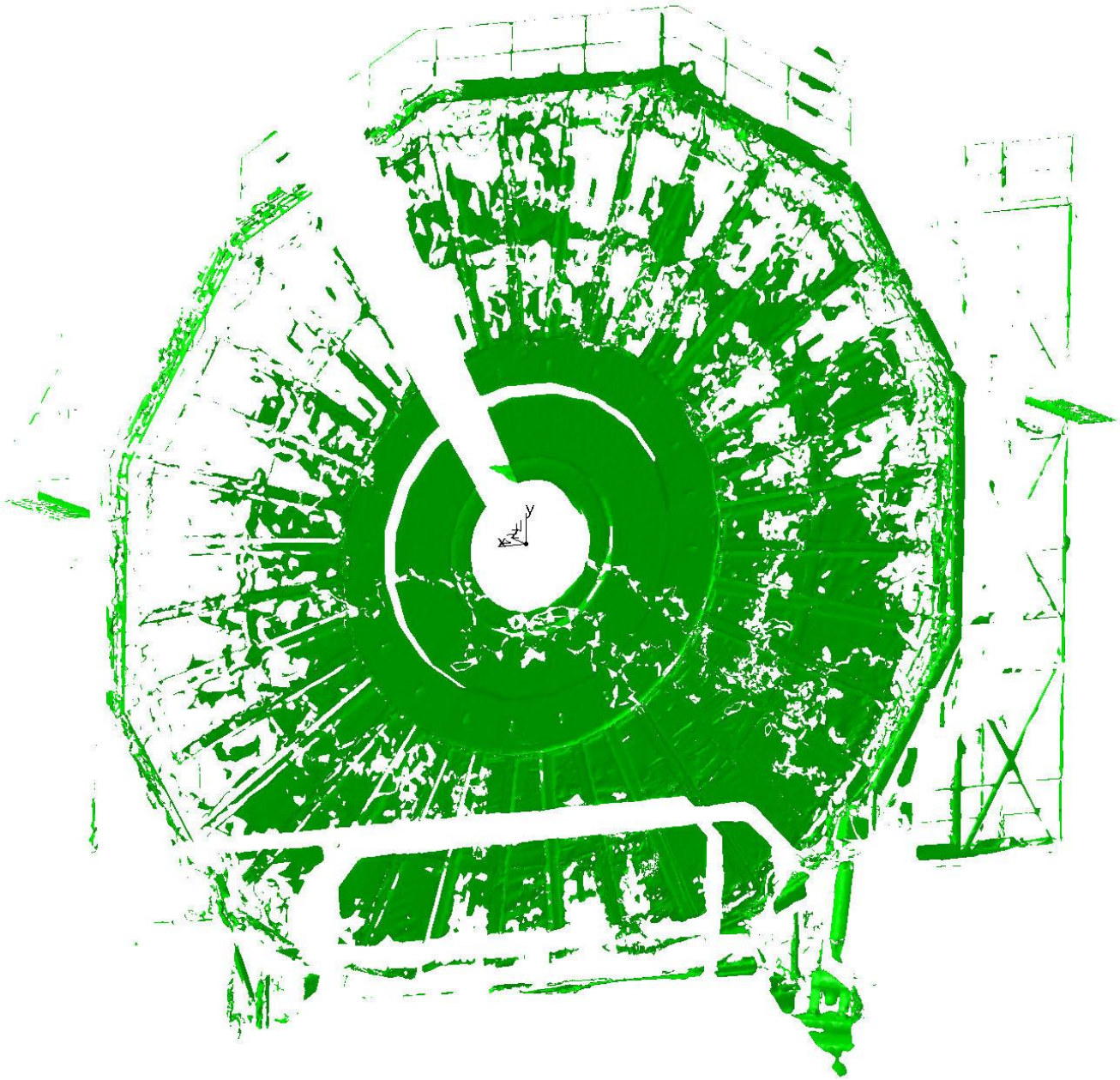
Thanks for attentions!

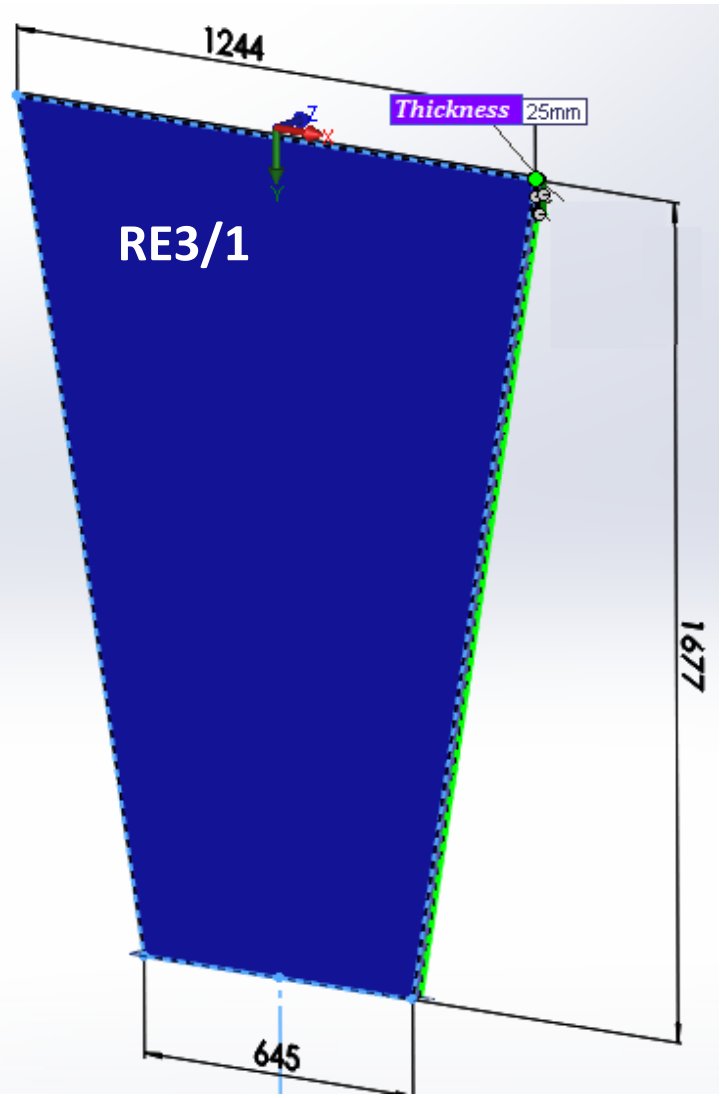
Background

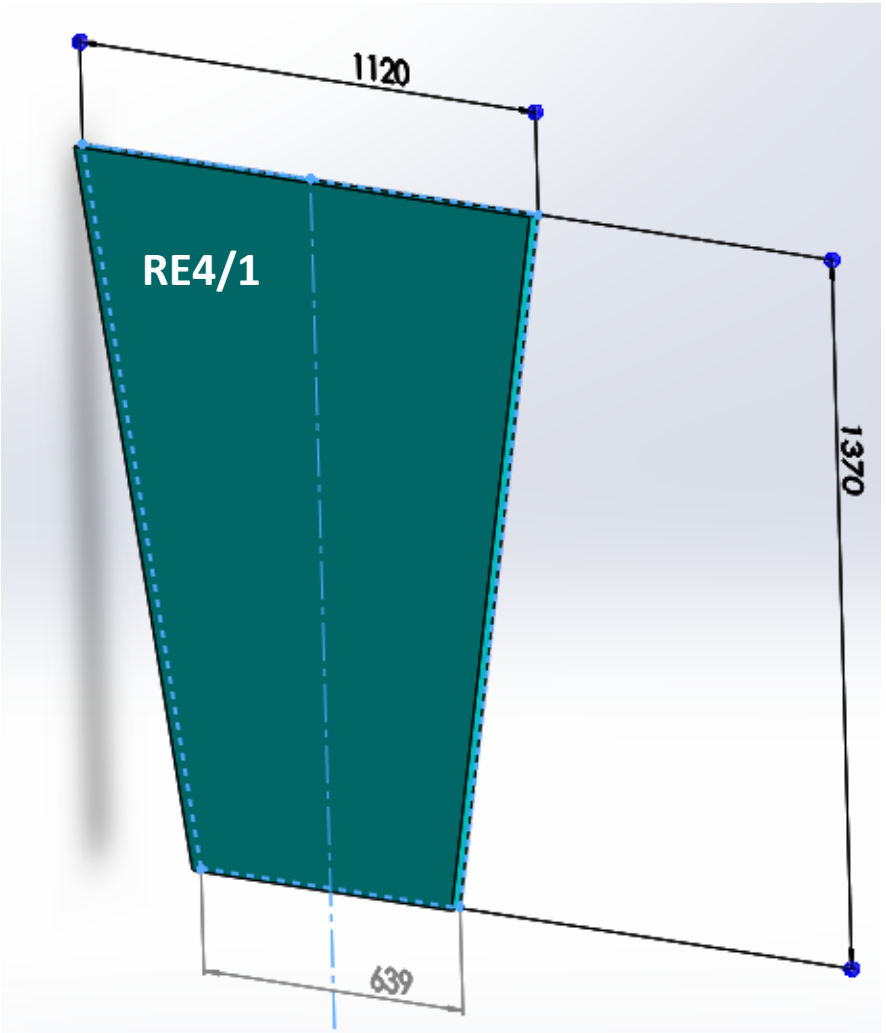
Scan YE/-2



Scan YE/-3



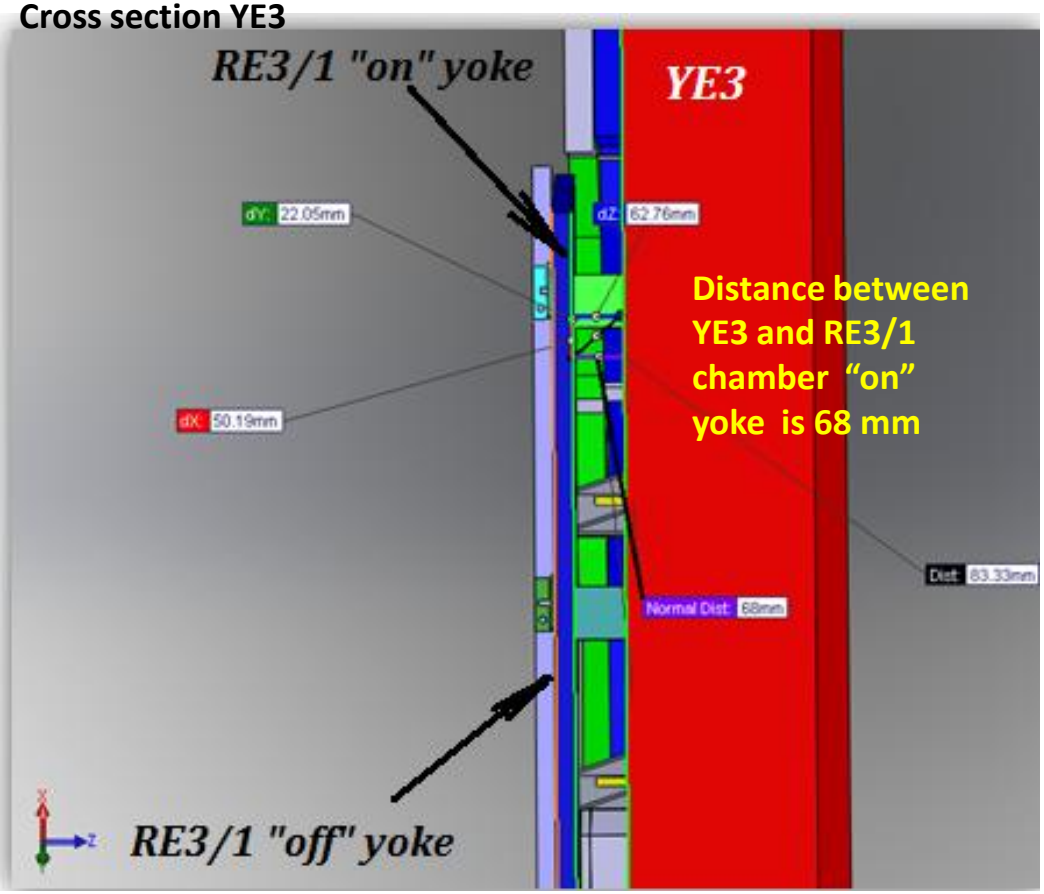

1244
Thickness
25mm
RE3/1
1677
645


1120
RE4/1
1370
639

Available space for mounting FEBs

Available space for mounting FEBs is 68 mm

Cross section YE3



Space between RE3/2 and RE3/1 for the cooling/power connectors