HERD – SCD meeting

Mechanics status

02/06/2023

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Brief agenda

- Square silicon side size reduced
- Fan-out electronics, new envelope
- Front-end electronics and cabling clearance
- SCD side, fixations to ground

NOTE: purple is used for things added during or after the meeting

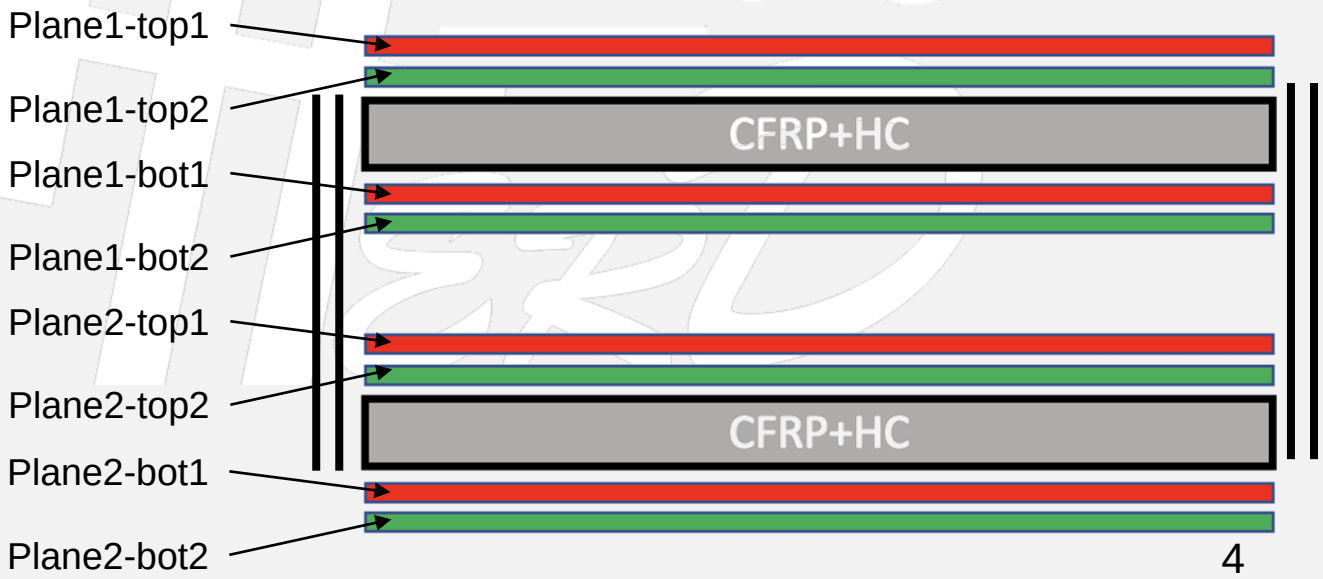
Detector size update

Detector specs.

Top pack	No. of tiles X*	No. of tiles Y*
Plane1-top1	-	256
Plane1-top2	256	-
Plane1-bot1	256	-
Plane1-bot2	-	256
Same for plane 2	-	-

side pack	No. of tiles X*	No. of tiles Y*
Plane1-top1	-	128
Plane1-top2	128	-
Plane1-bot1	128	-
Plane1-bot2	-	128
Same for plane 2	-	-

Total number of tiles top: 2048
Total number of tiles per side: 1024
Total number of tiles: 6144



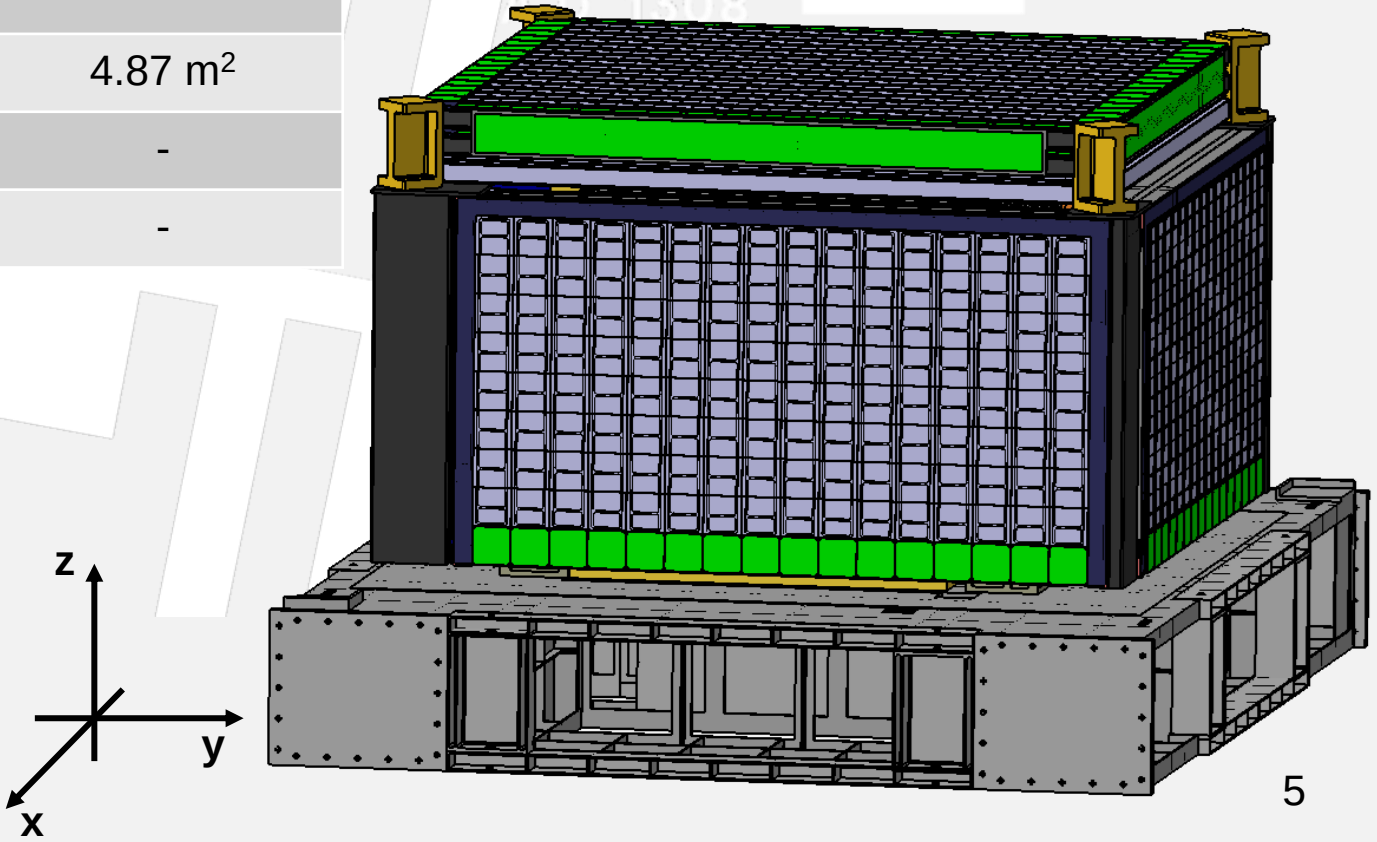
*wrt plane reference system (Z normal)

Wrong color coding. The silicon orientation is sym. wrt the plane center

Detector specs.

Plane position (global ref)	Detective area X (global ref)	Detective area Y (global ref)	Detective area Z (global ref)
X+	-	4.87 m^2	4.87 m^2
X-	-	4.87 m^2	4.87 m^2
Y+	4.87 m^2	-	
Y-	4.87 m^2	-	4.87 m^2
Z+	9.73 m^2	9.73 m^2	-
Z-	-	-	-

Total number of tiles top: 2048
Total number of tiles per side: 1024
Total number of tiles: 6144
Silicon size: 97.5 x 97.5 mm^2
Total silicon area: 58.41 m^2

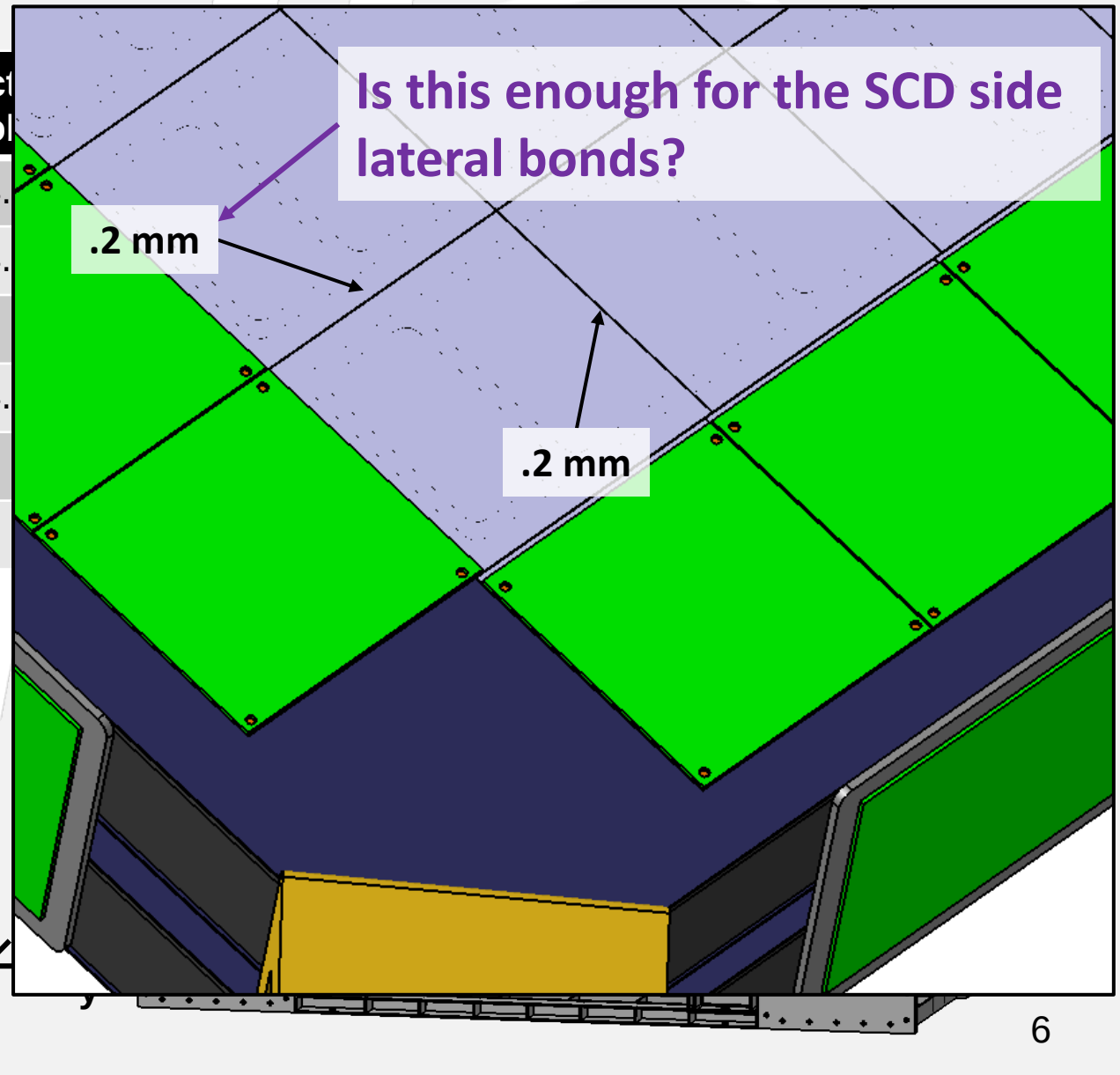


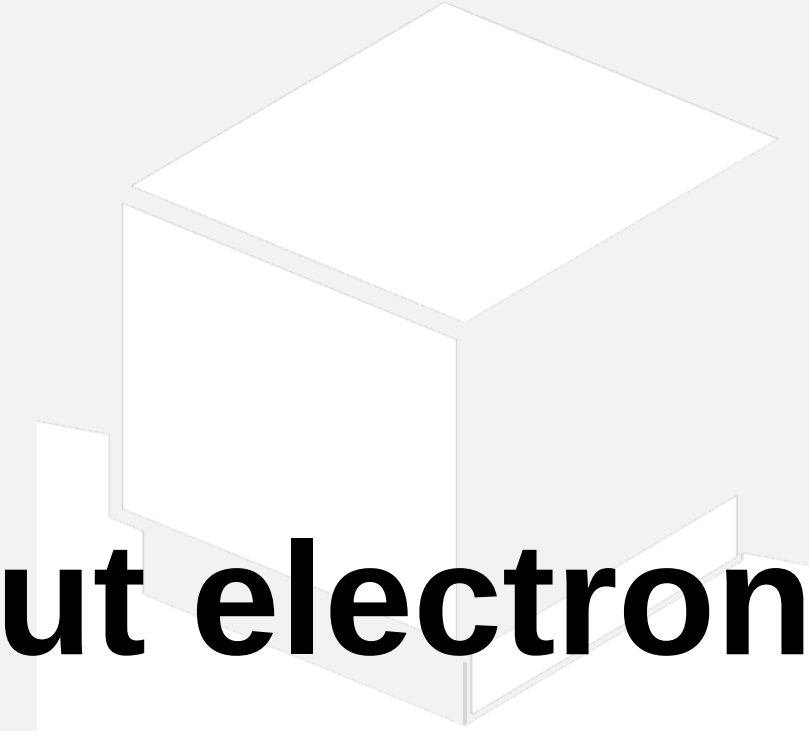
Detector specs.

Plane position (global ref)	Detective area X (global ref)	Detective area Y (global ref)	Detect Z (glo
X+	-	4.87 m^2	4.
X-	-	4.87 m^2	4.
Y+	4.87 m^2	-	
Y-	4.87 m^2	-	4.
Z+	9.73 m^2	9.73 m^2	
Z-	-	-	

Total number of tiles top: 2048
Total number of tiles per side: 1024
Total number of tiles: 6144
Silicon size: 97.5 x 97.5 mm^2
Total silicon area: 58.41 m^2

Spacing between silicon: .2 mm
Spacing between ladders: .2 mm
NOTE: silicon spacing can be reduced on the side but on top it must be equal to the ladders'.

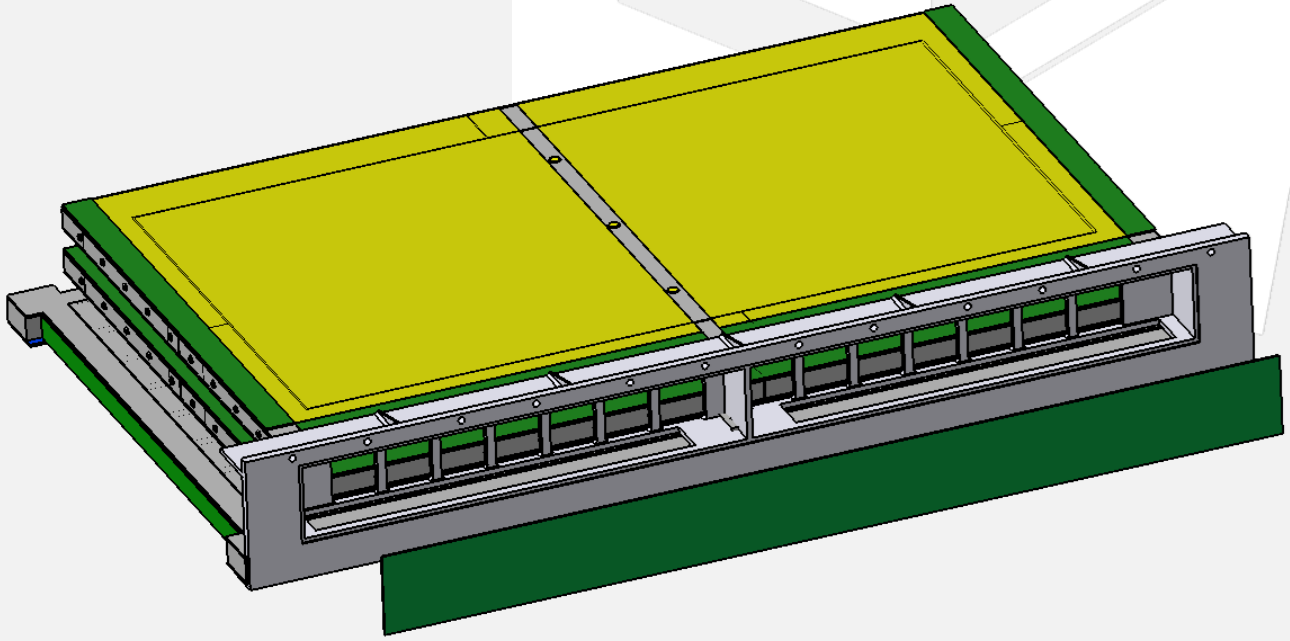


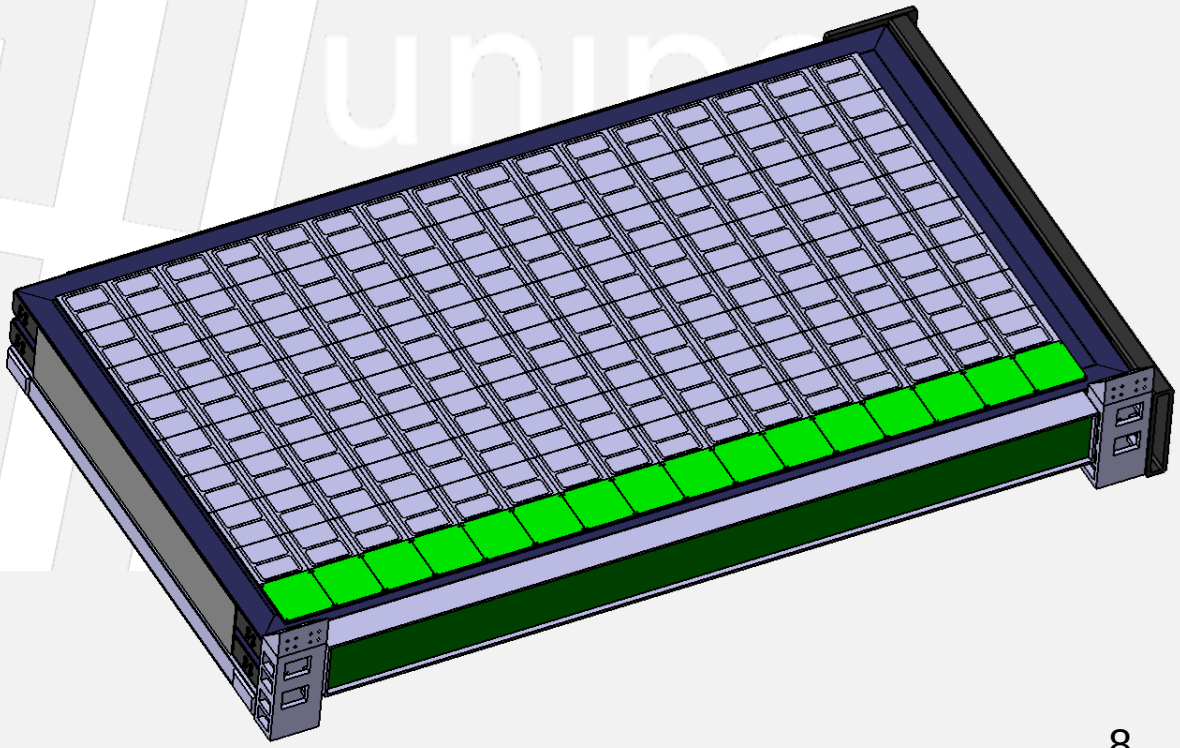


Fan-out electronics

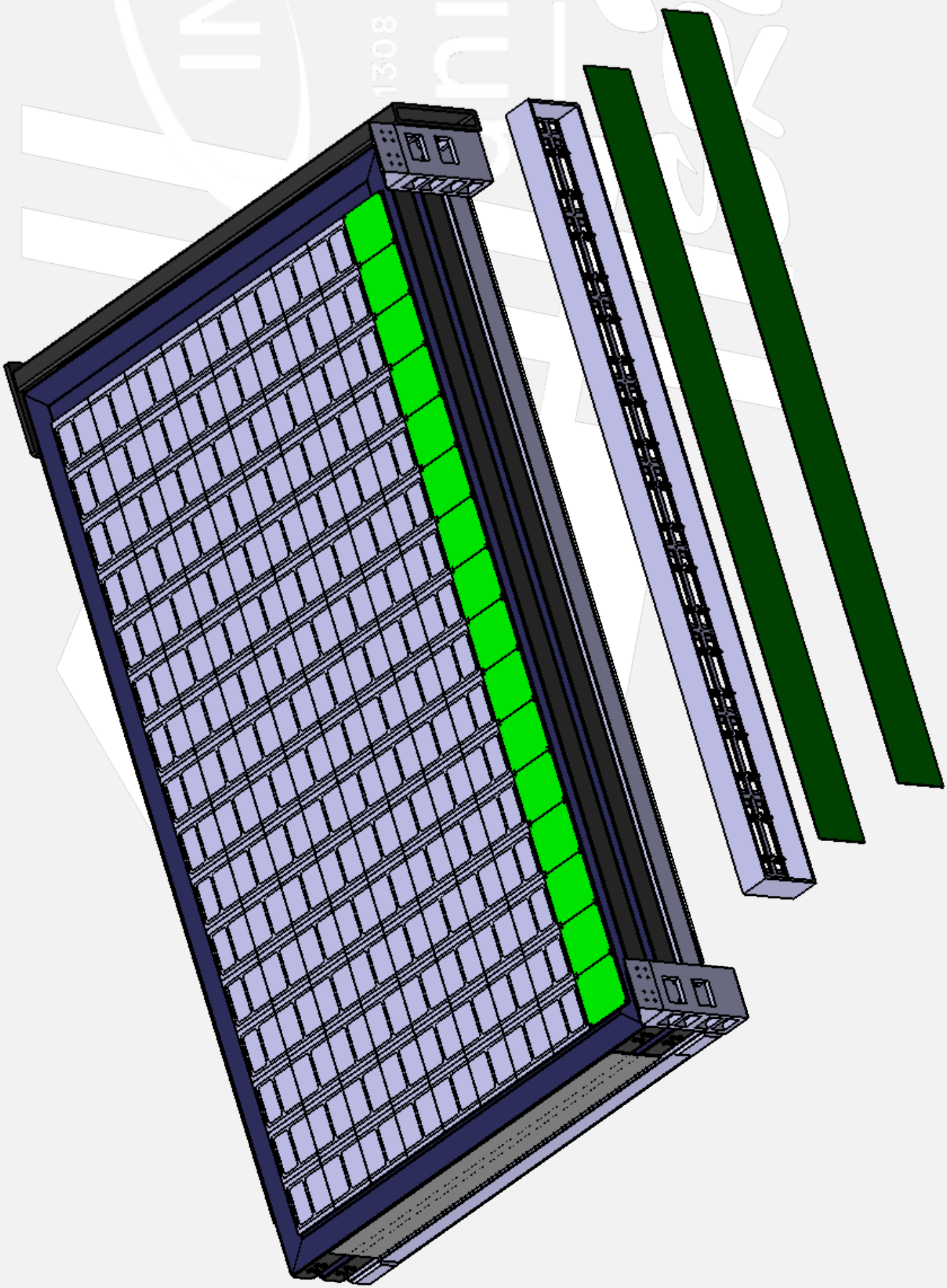
Fan-out electronics

- Old design: 1564x142 mm^2
- PCB dimensions according to the present design: 1488x108 mm^2

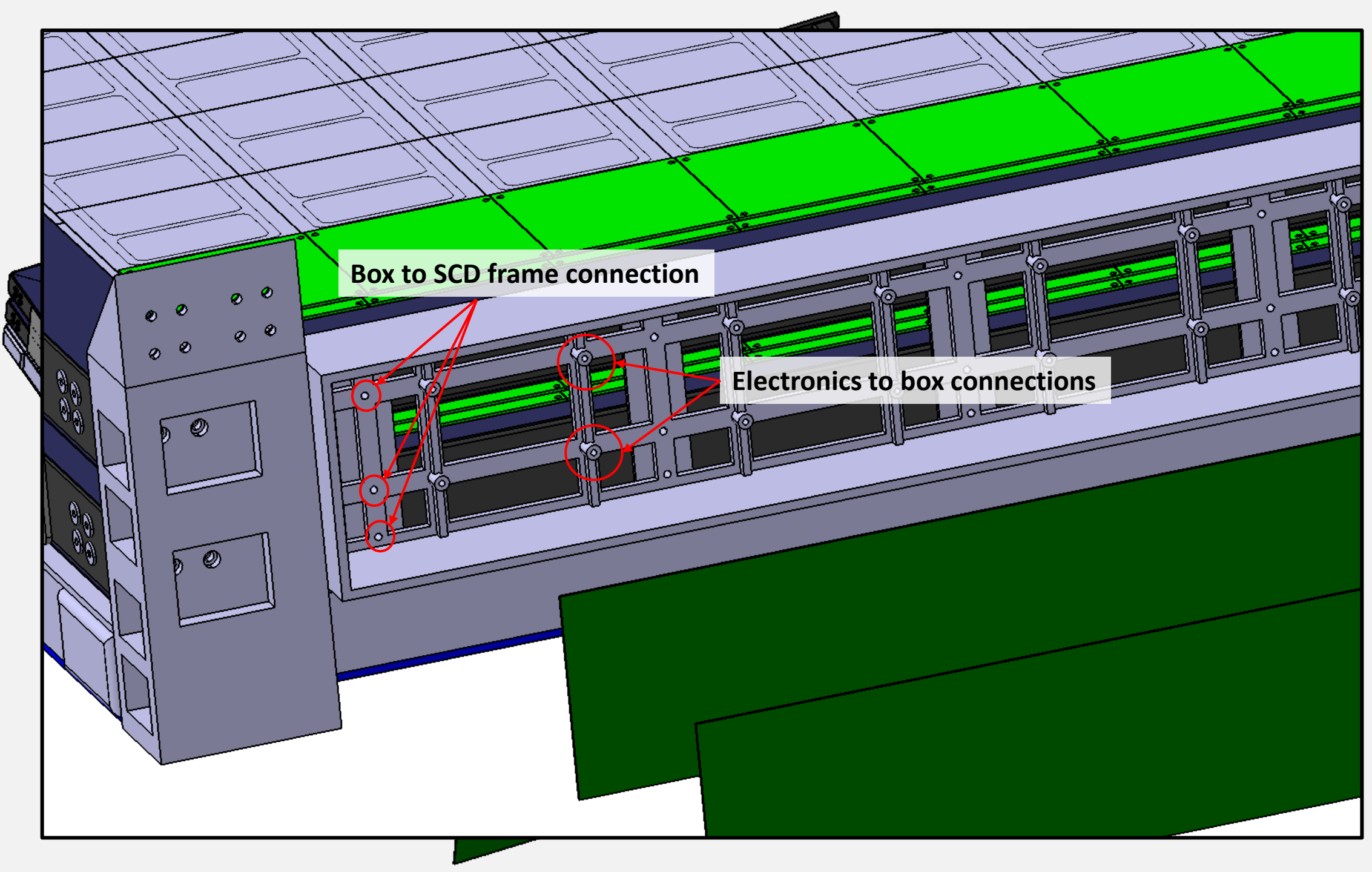




Fan-out electronics



Fan-out electronics

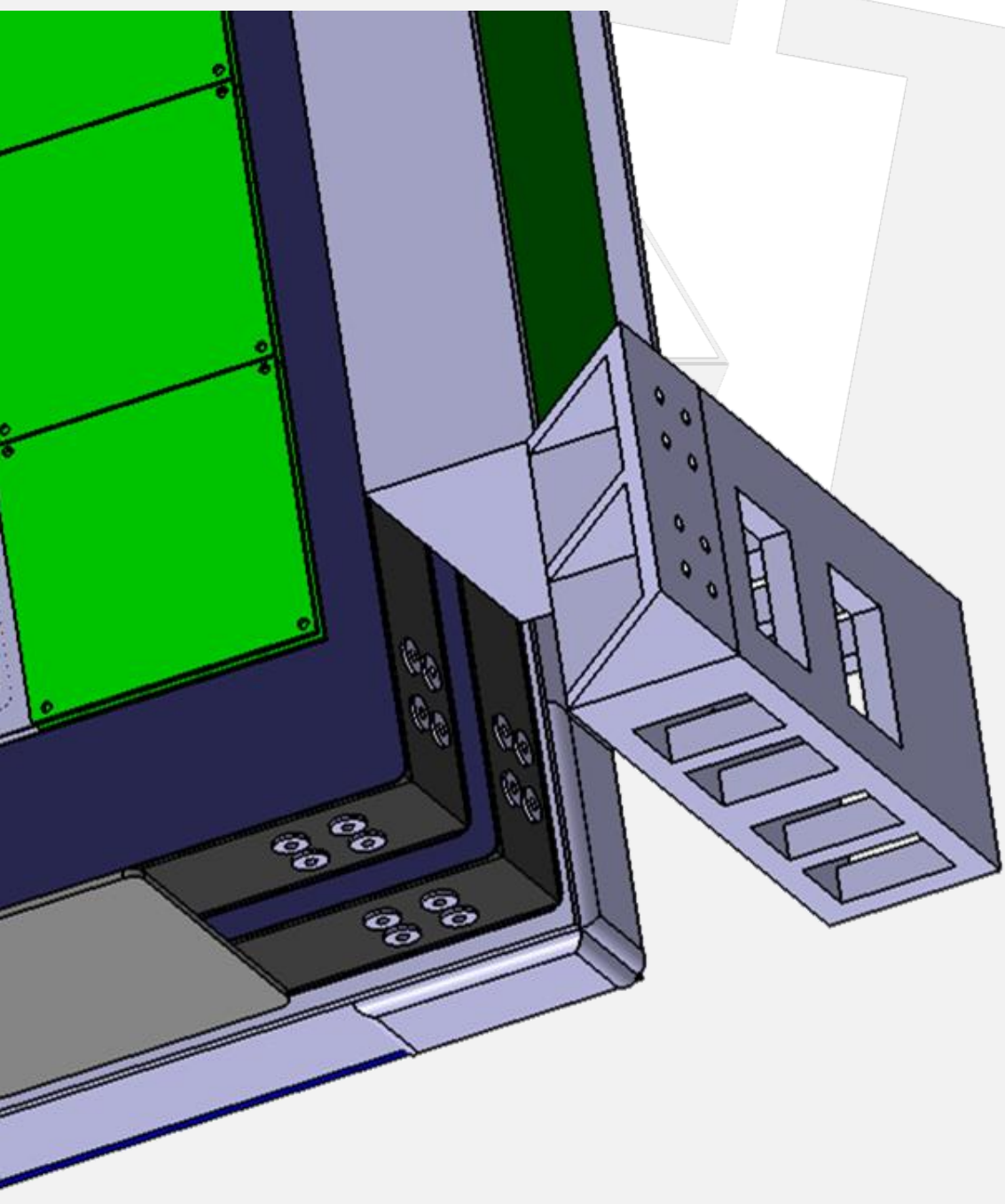


Discussion Gong-Edoardo-Rujie

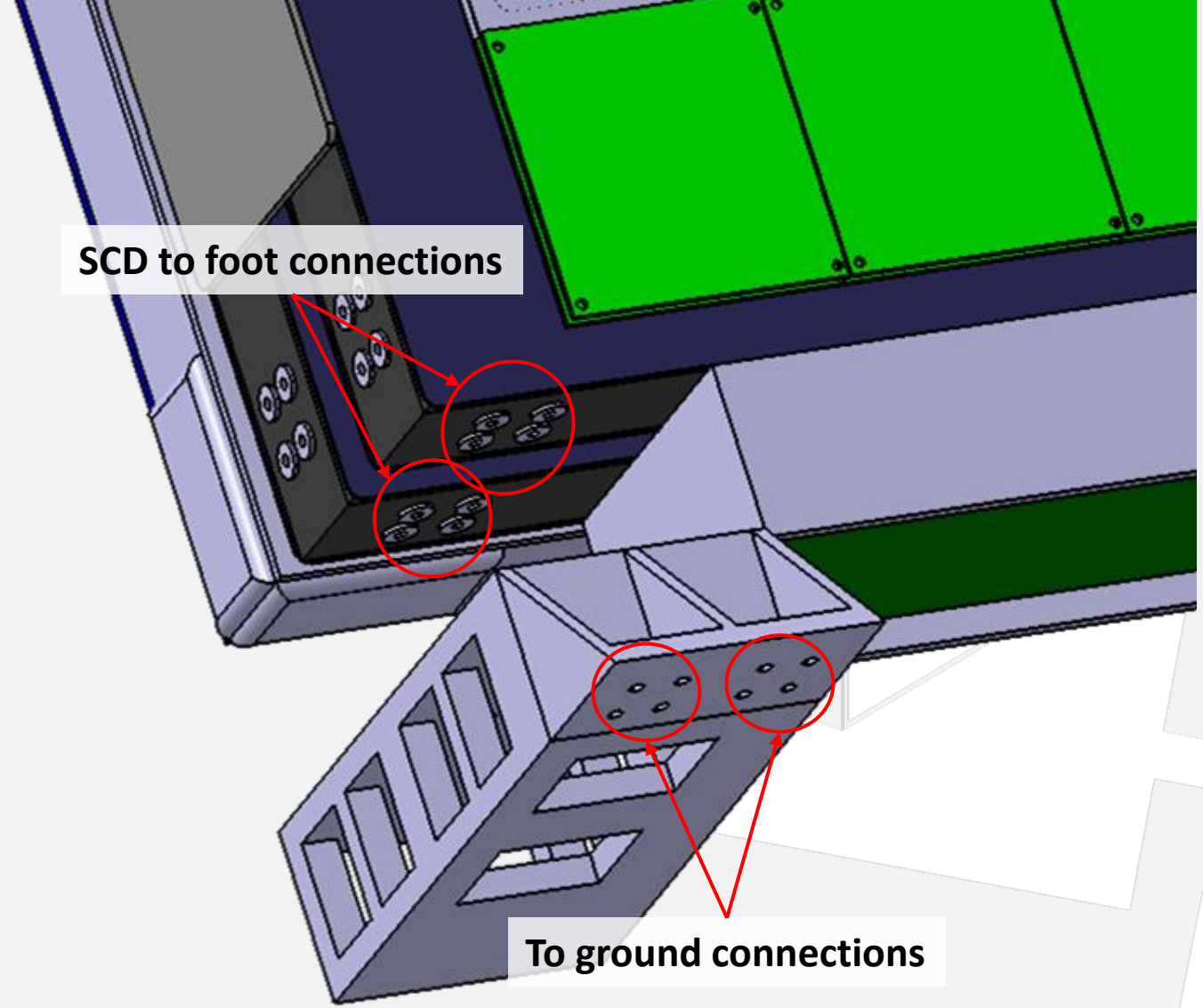
- **Edoardo**
  - will try to reduce the feet dimensions so have an electronics size as close as possible to the detector size
  - will send the updated CAD version to Rujie for thermal analysis.
    - Evaluate also the possibility to use the debris shield as a radiator along with the pipes (**Rujie**)
- **Gong**
  - will try to develop more than one front-end PCB design so to have the connector or the side and gain some space

To ground mech. connection

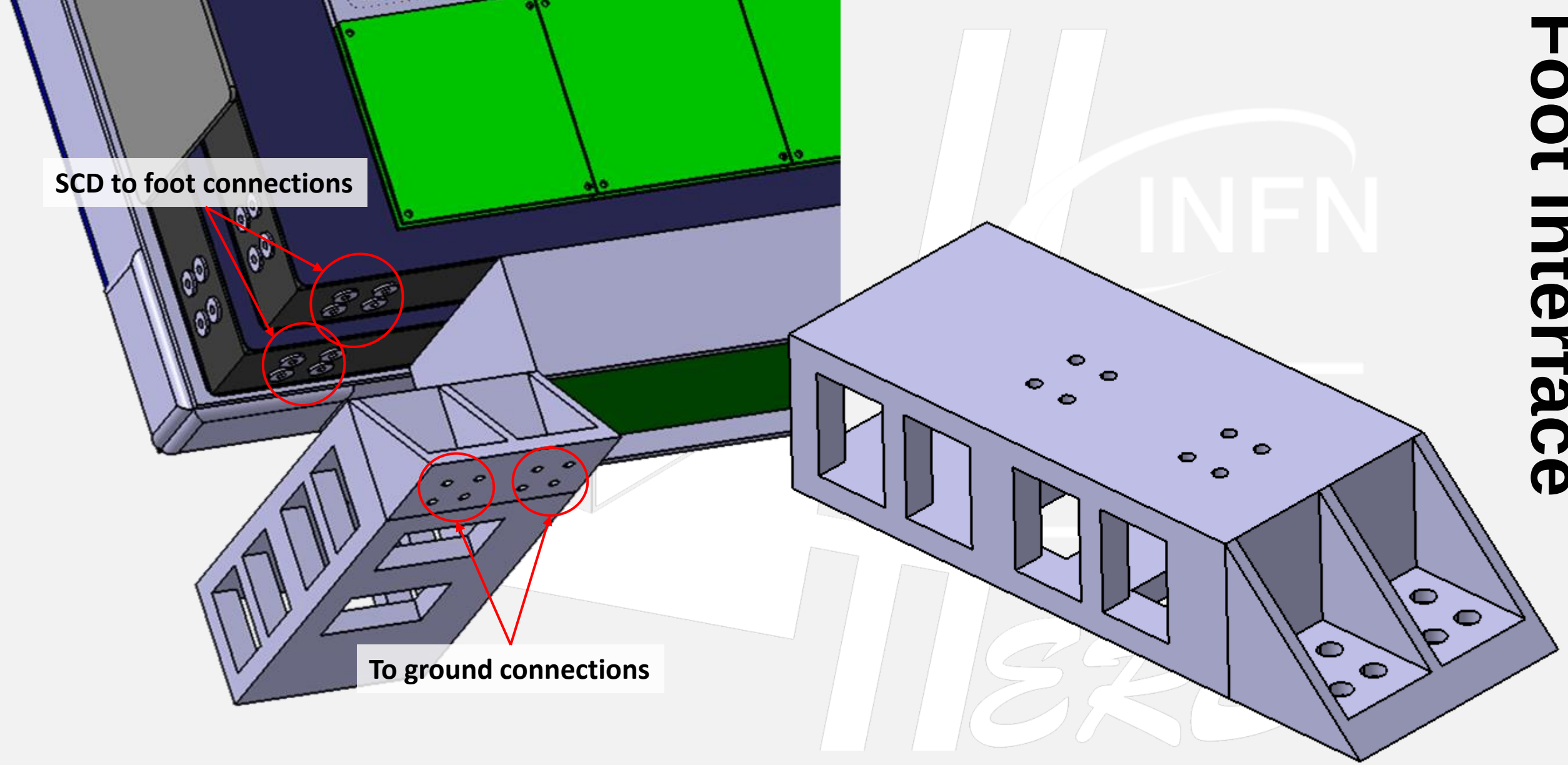
Foot interface



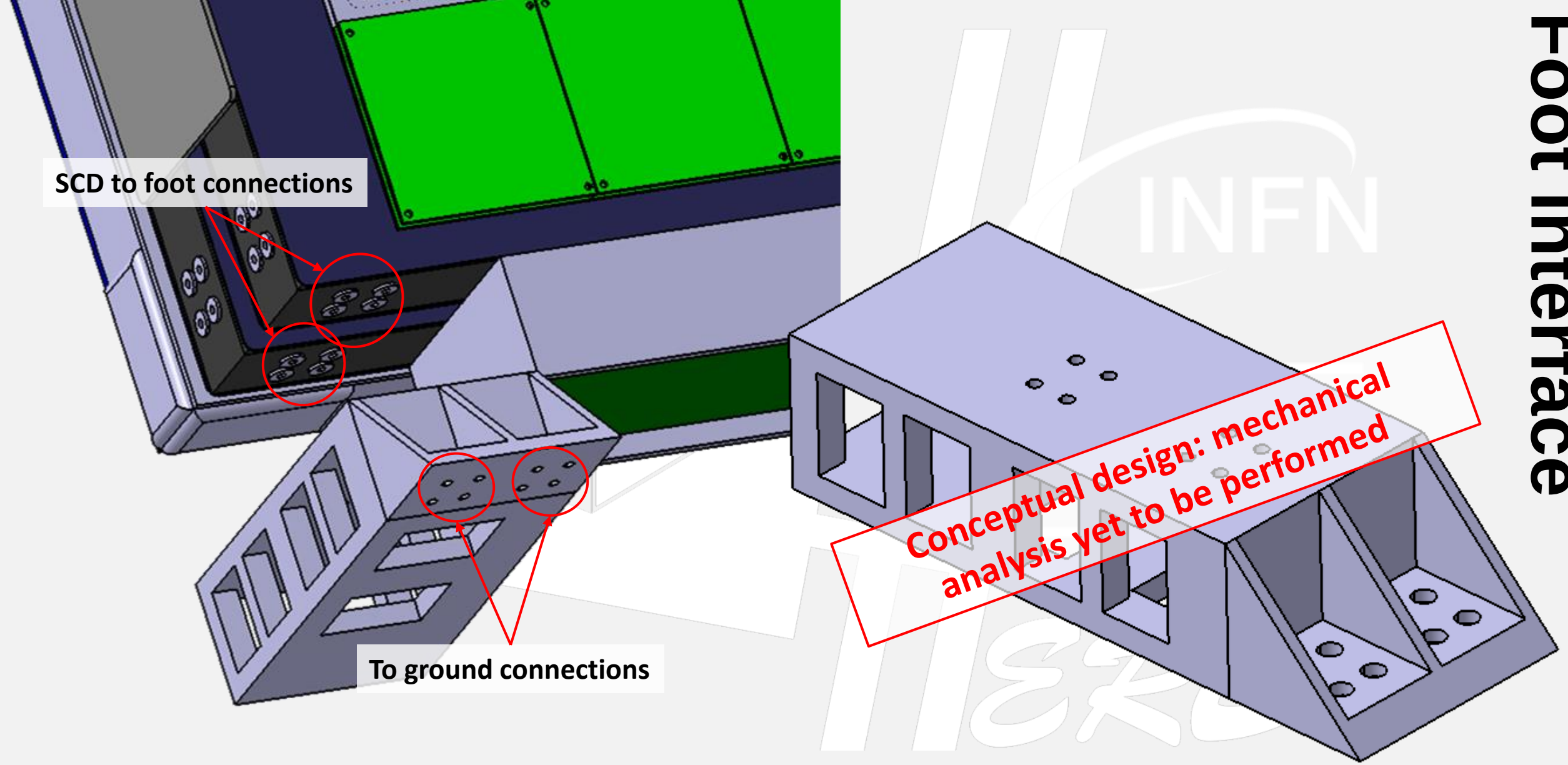
Foot interface



Foot interface



Foot interface



NOTE: the present design foreseen a feet front fixation. Accessibility consideration could lead to a both sides fixation which is better from a mechanical point of view

Front-end electronics

Front-end electronics

Questions:

- The top and side SCD have the same front-end electronics dimensions?
- Is the side clearance (20 mm) acceptable?
- Is the top clearance (25.8) acceptable?

Front-end size

Dimension of the present design:

- 100 mm x 97 mm
- .2 mm spacing between PCB and S

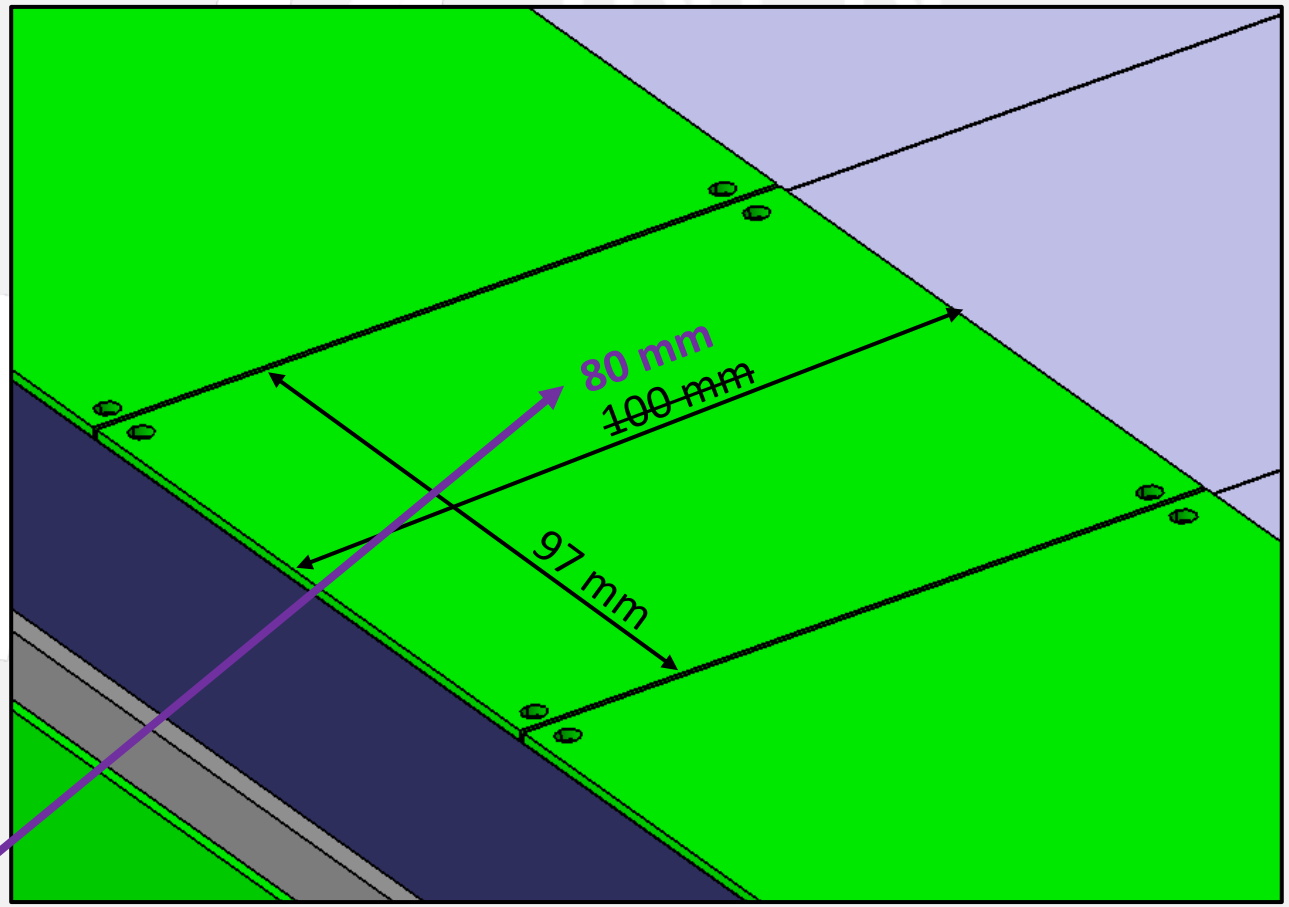
Dimension 1 (97 mm) constrained by silicon size and ladders' spacing:

- max: 97.5 mm + .2 mm – margin*
- min: detector considerations (microbonds)

Dimension 2 (100 mm) unconstrained:

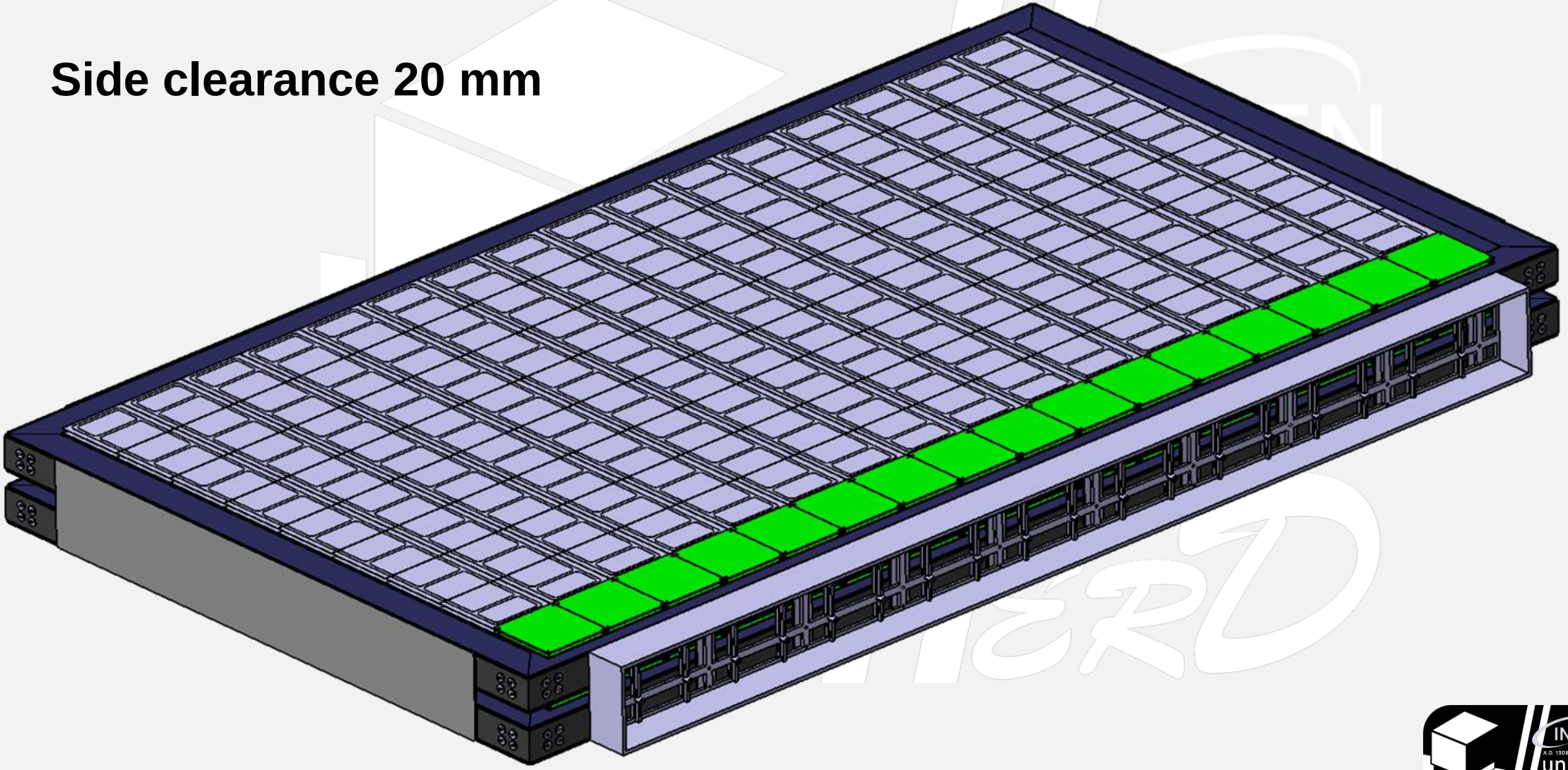
- The smaller the better. Every mm gained is added to the routing clearance
- **Answer from Gong: yet to be defined. For now, go with 80 mm**

*Accounts for the PCB manufacturing accuracy

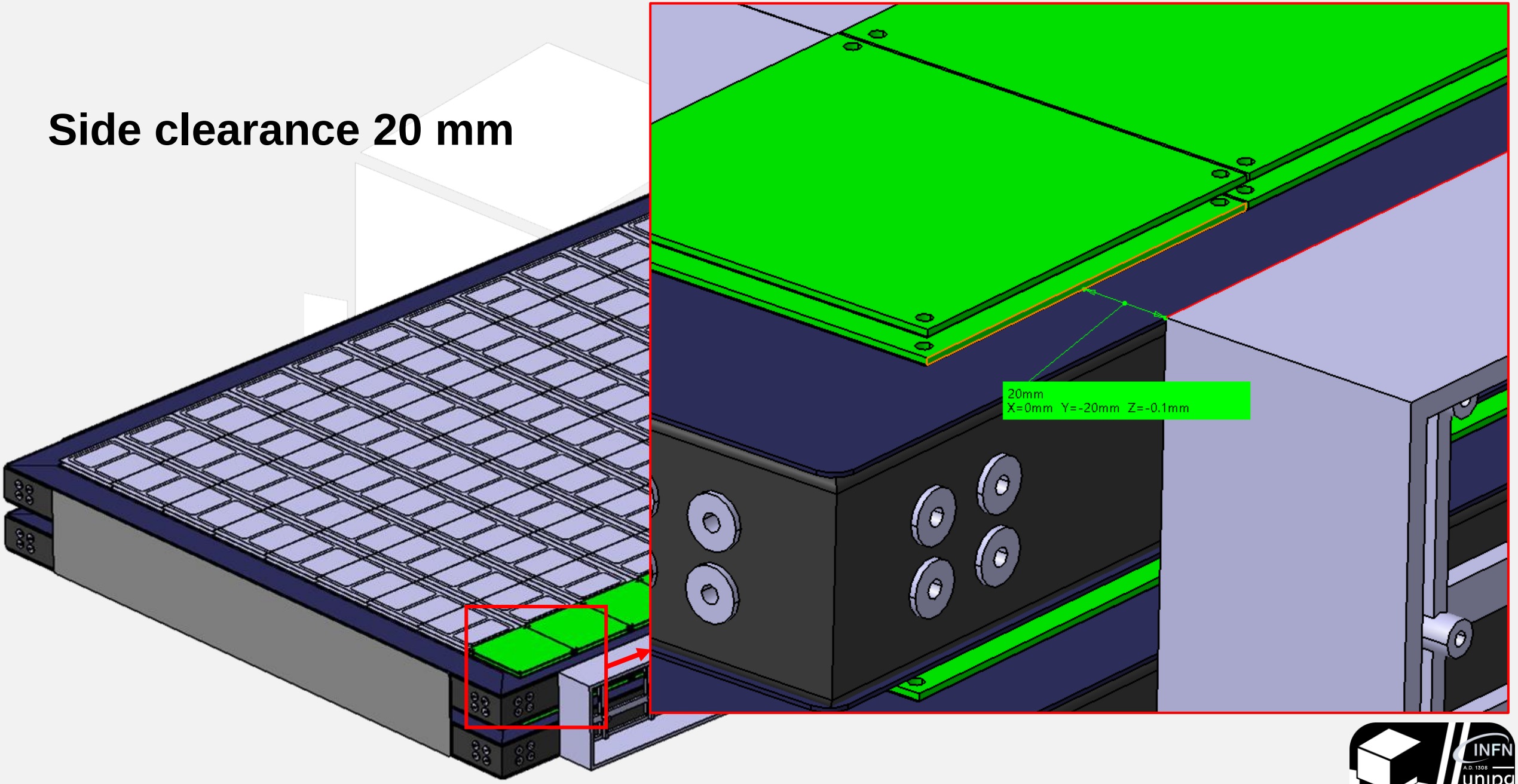


NOTE: in this design the front-end dimensions are the same for the top and the side

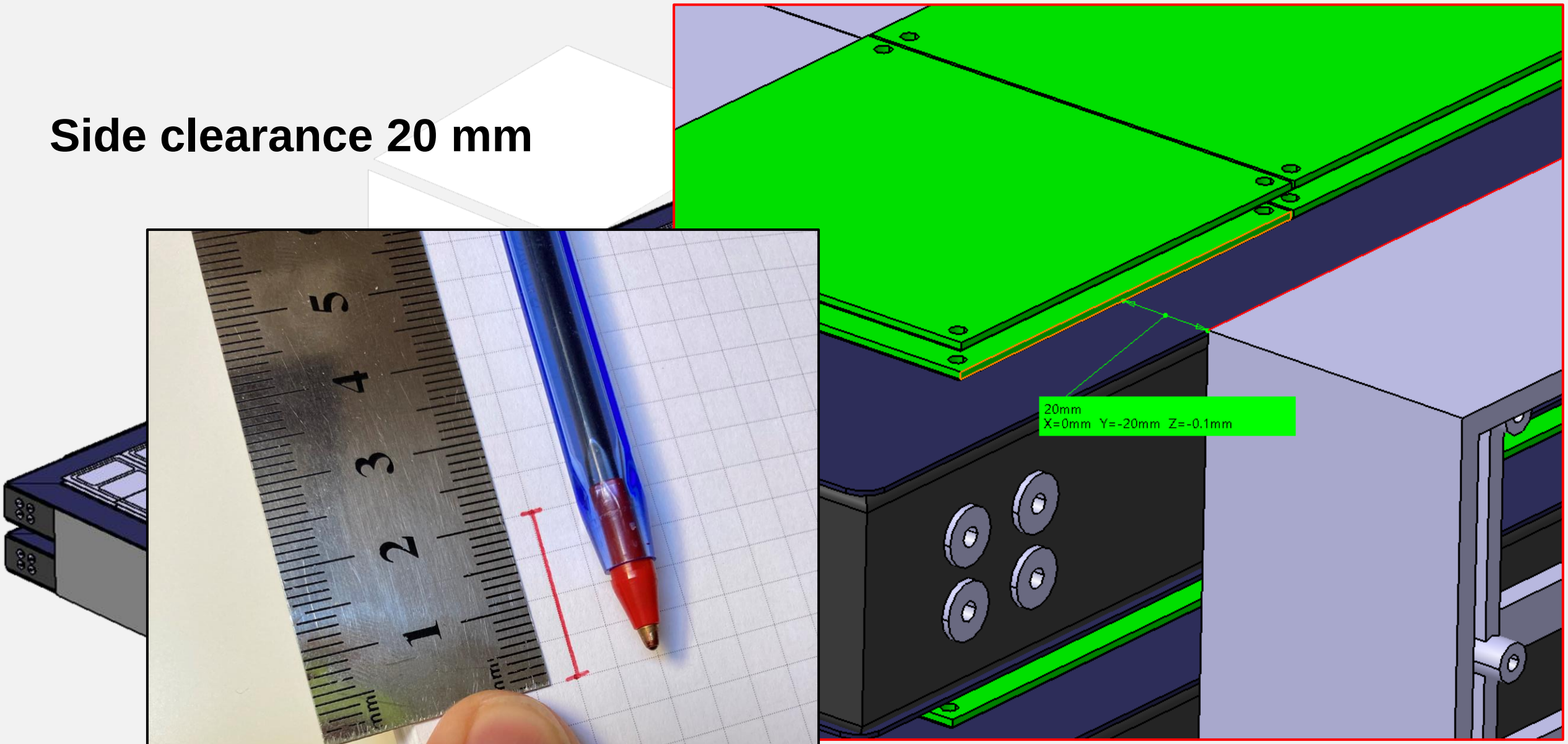
Side clearance 20 mm



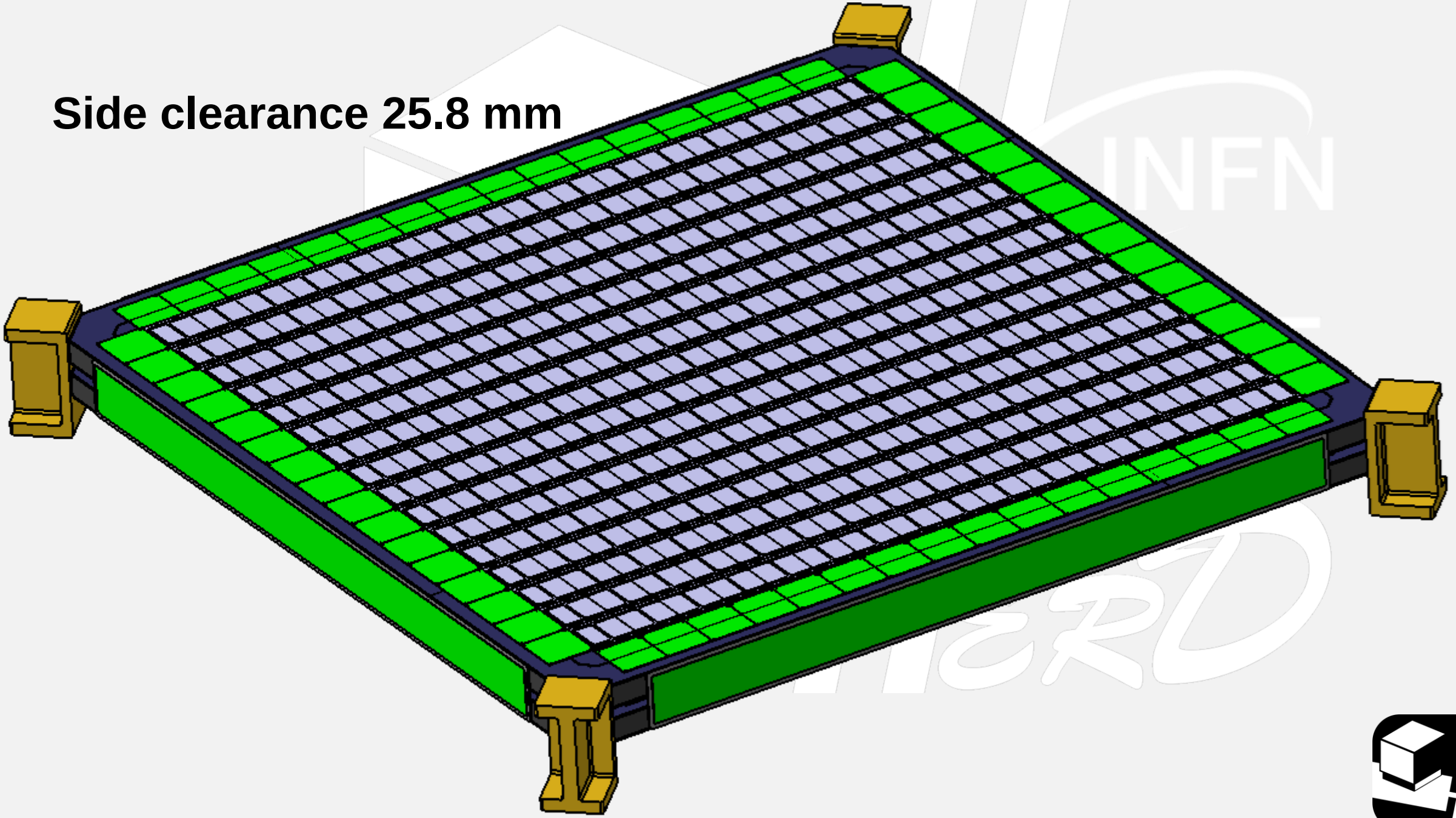
Side clearance 20 mm



Side clearance 20 mm



Side clearance 25.8 mm



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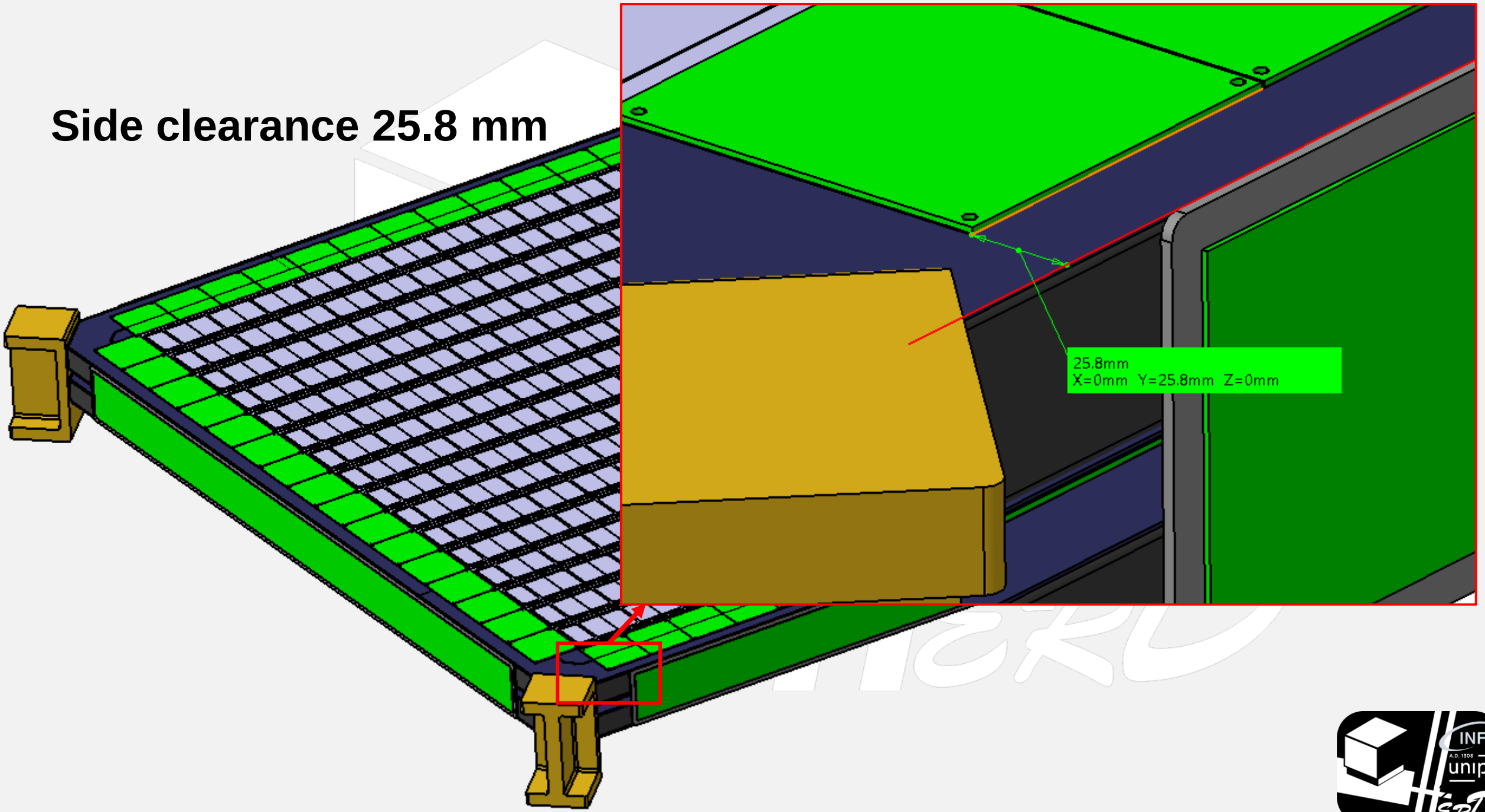

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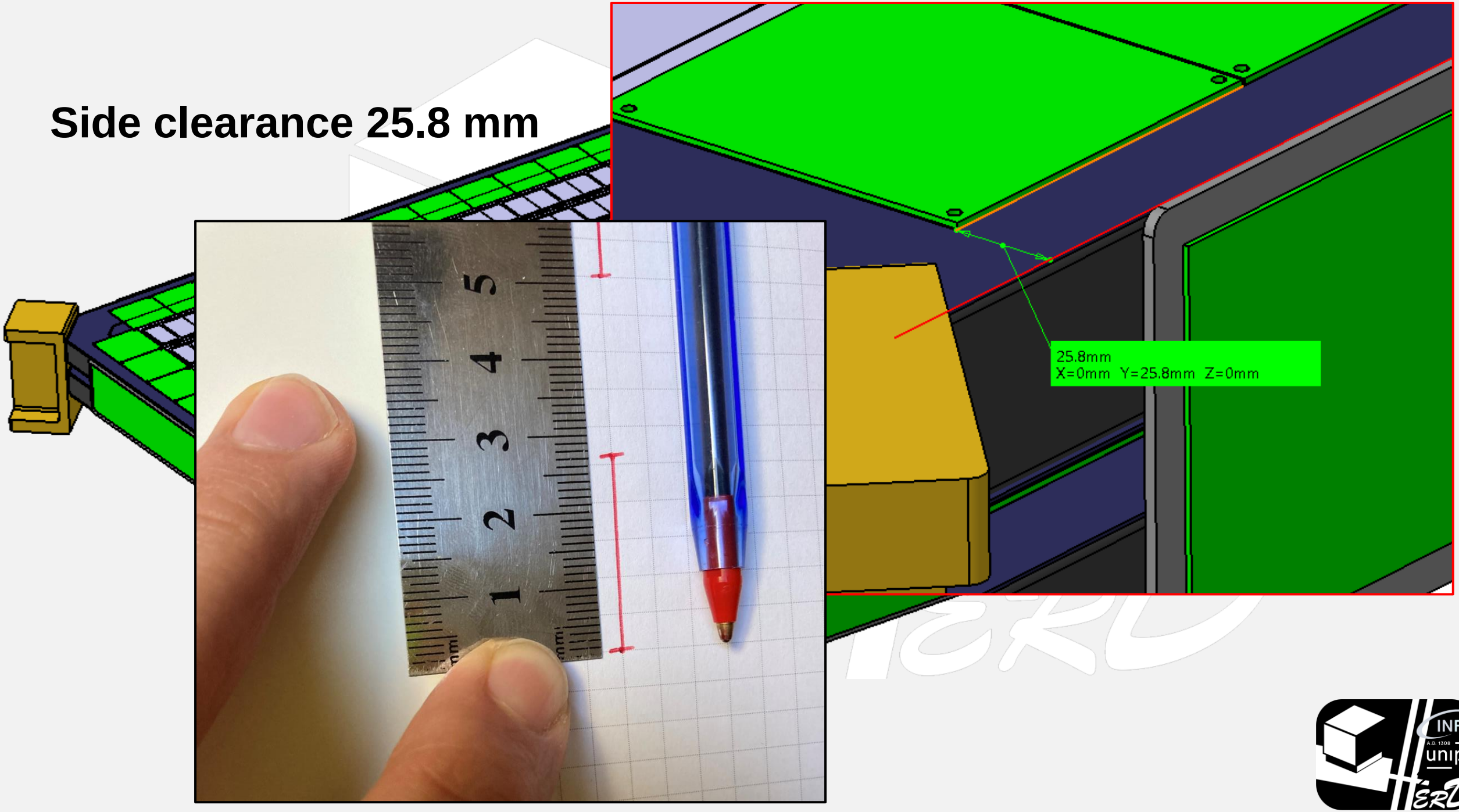

Thanks for the attention