
ITk Integration

Lecce May - 9th – 2024

Emiliano Dané on behalf ITk Frascati collaboration

General items

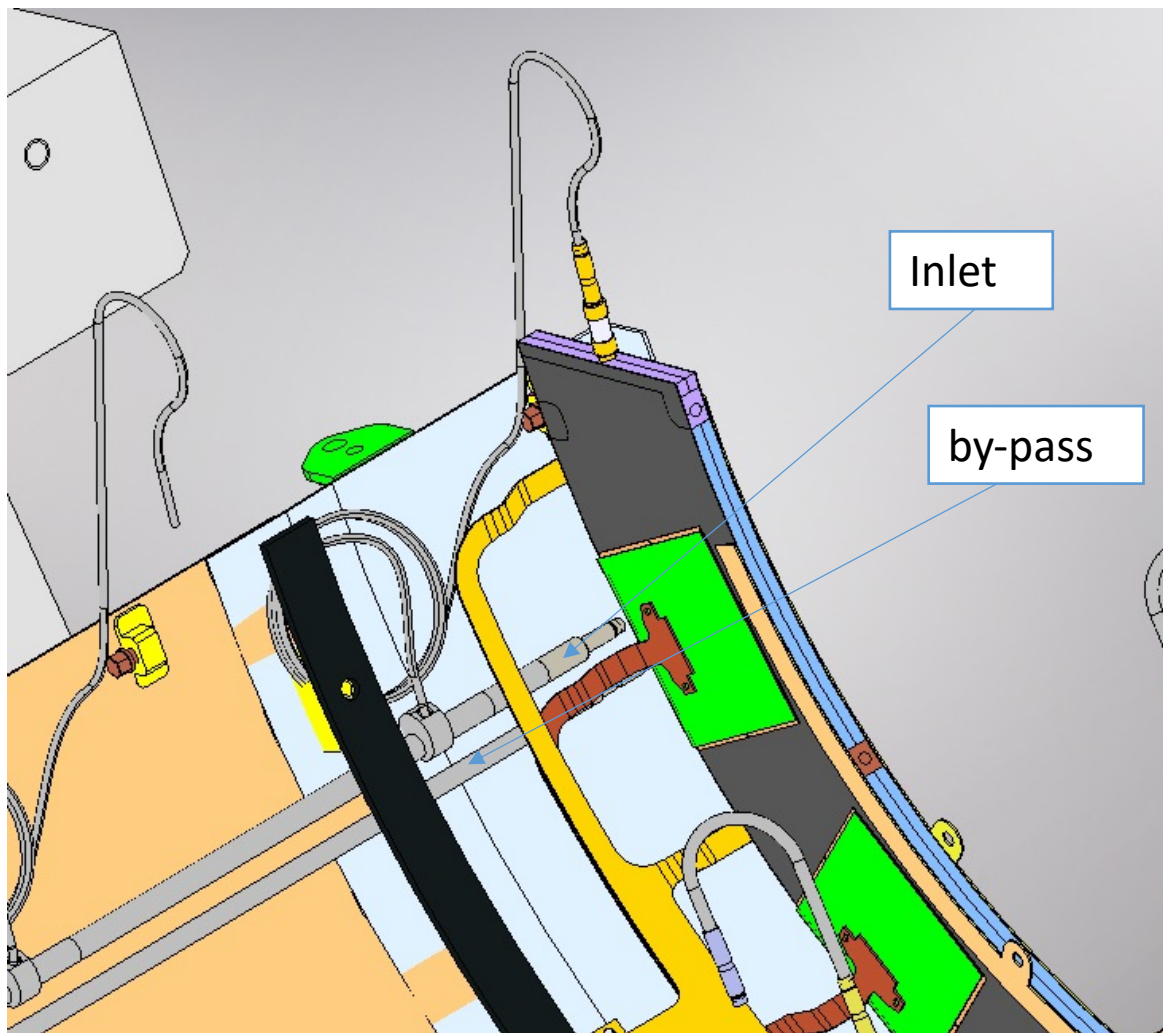
- The Clean Room is almost complete;
- The Nitrogen plant is installed and under pressure test;
- The climatic chamber now has a backup plant in case of bad-functional working of the air pressure plant. (some bottle of artificial air are connected to an automatic switch system in order to cover this item);

Things to do:

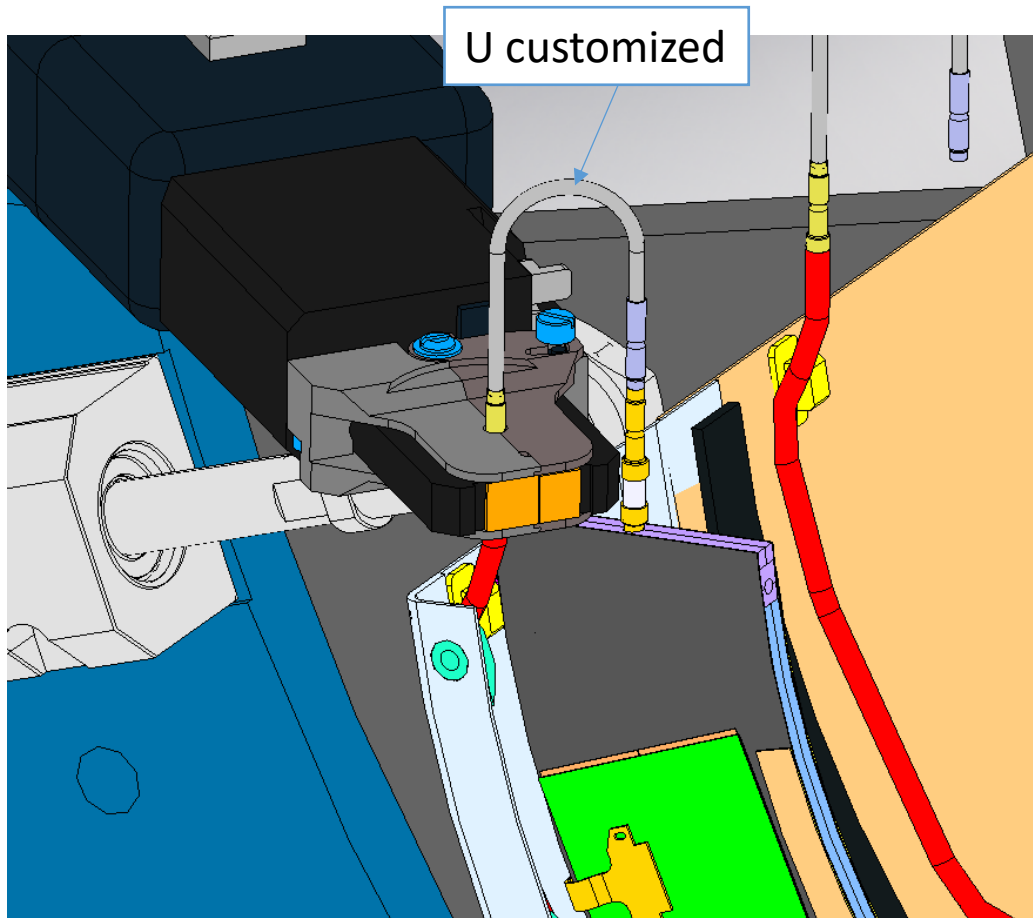
- Define a detailed procedure for the ITk Assembly (together with UK and the coll.)
- Check the compatibility of all the assembly tool (cabling, piping ecc..) with the Assembly tool
 - Make a repository for all the Assembly toolings
- Find a solution for the Functional test in Climatic Chamber
- Solution for the Shipping

1° attempt to go in detail for the assembly activities
(focusing on weldings – S. Coelli)

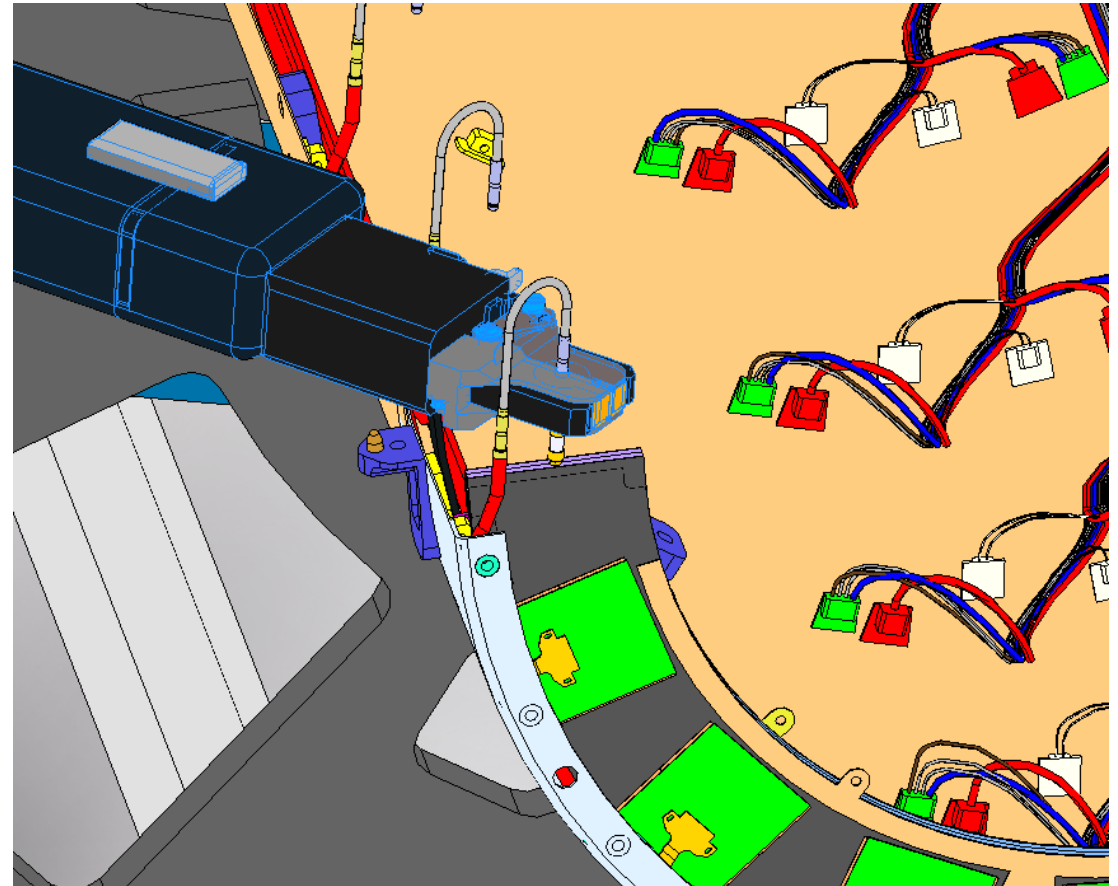
| | Activity | Comment | Estimated Time |
|----|-----------------------------|--|----------------|
| 1 | HS positioning | Both the empty half shelves will be in position in the trolleys and test the mating in order to do the zero | |
| 2 | Pipe positioning | In Milan they are testing the insertion in 2 pieces: Inlet (1) and exhaust plus the by-pass (2) in order to make it easier. Pipe holders to define (not clear to me). Pipes goes everywhere.. they are not selfsustaining. | |
| 3 | by-pass welding | welding of the bypass with the pipes placed inside the HS (Is there enough room for the WH?) | |
| 4 | Leak or/and Pressure Test | re-working (socket baseline) | |
| 5 | 1st Manifold welding | Suggested by Simone: socket, Mechanical tool to hold the Welding Head. Procedure has to be tested. | |
| 6 | Cabling (Harness) insertion | | |
| 7 | C-stifness positioning | | |
| 8 | Half Ring positioning | in what order do we place the half rings? (could be from high z?) | |
| 9 | Pipe HR welding Exhaust | 2 weldings: Start with welding the Outlet. The U (exhaust) part is custom on place. First do the welding manifold side, then HR side. Suggested socket welding. Mechanical tool needed to hold the welding head. | |
| 10 | Leak or/and Pressure test | Not clear | |
| 11 | Pipe HR welding Inlet | 1 welding. Mechanical tool to hold the Welding Head | |
| 12 | Leak o Pressure test | | |
| 13 | HR electrical connection | Only the HS part. (with S. Coelli) | |



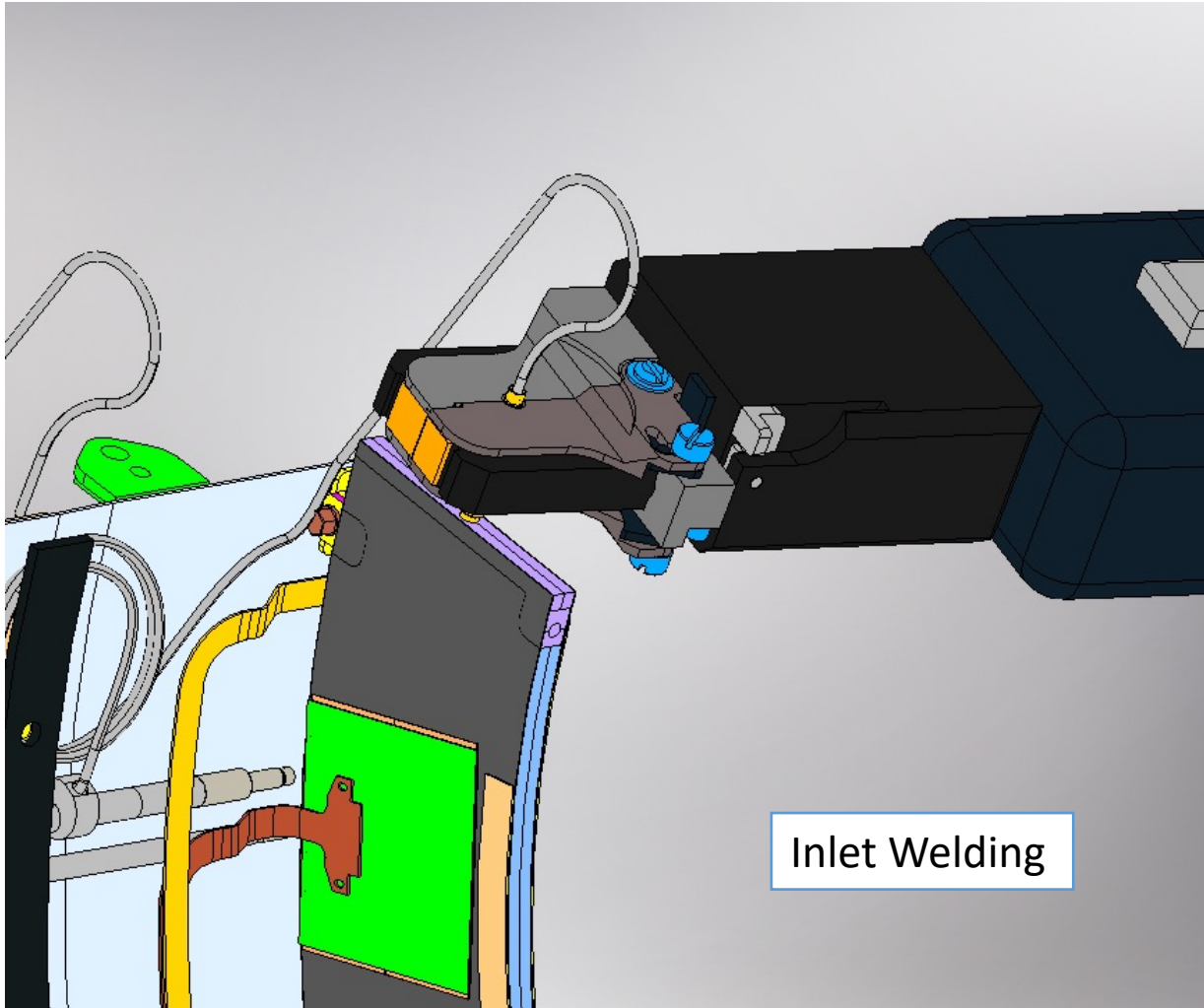
by-pass welding



1° exhaust welding

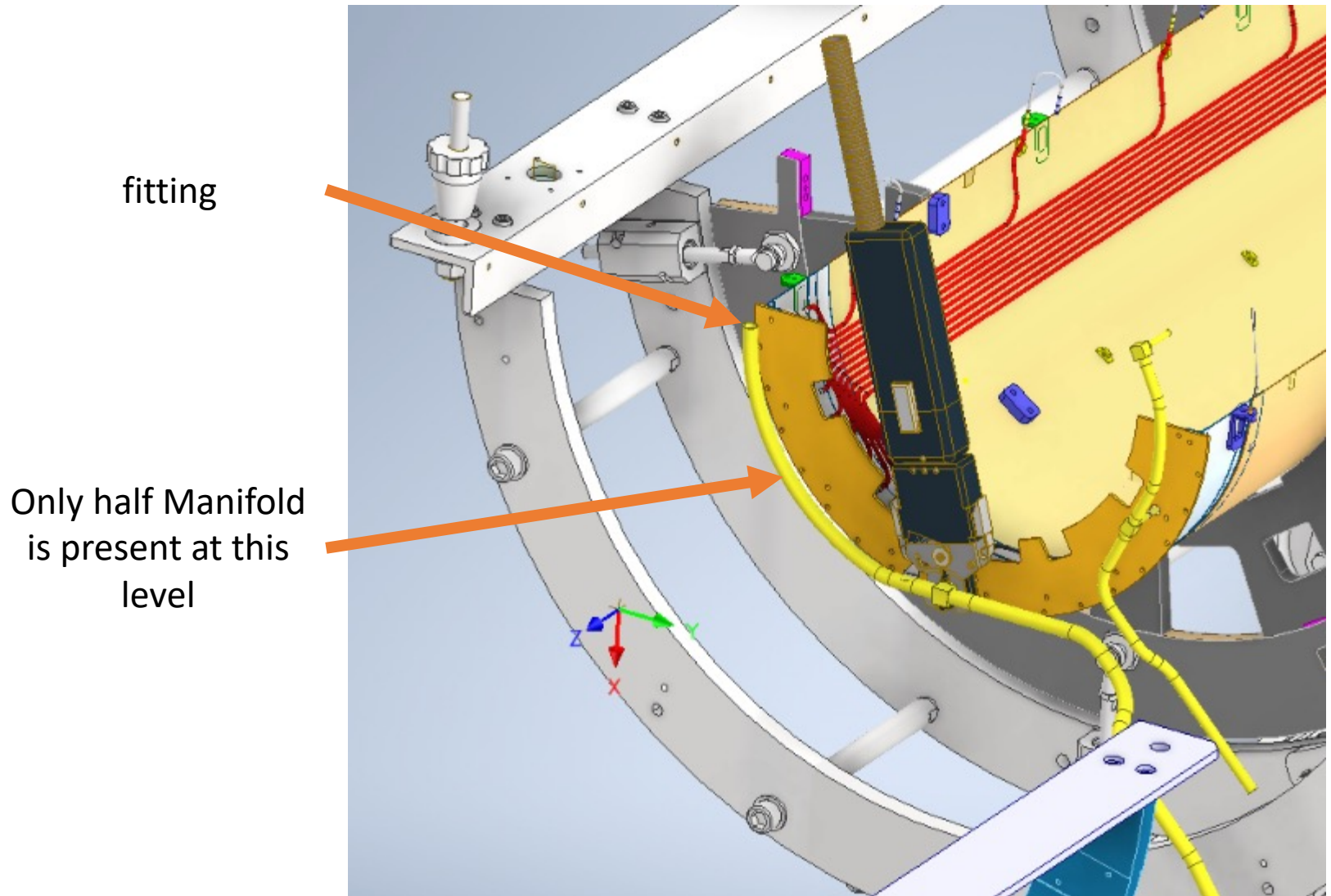


2° exhaust welding



Swagelok Welding
Head used in the
model

1° welding on manifold and test before the cabling insertion, just after the piping positioning



Maybe more comfortable putting the Assembly tool in vertical

The recovery could be done cutting, remove the entire piping, rework in workshop and restart the process or we can use another brand new one set of pipings

2nd welding after the mating of the layer

Removing this upper part of the trolley. we don't need at this level in order to have more room for the welding head

Here the recovery could be done by sleeves or reworking the pipes

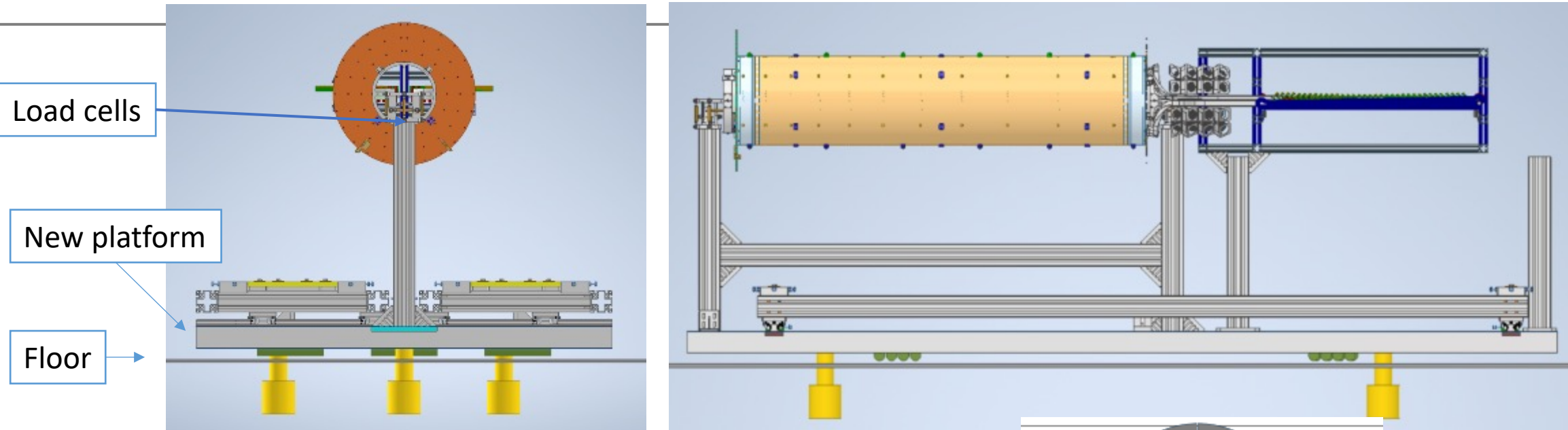
I don't know the mapping of HV in order to simulate the rooming available

Action (as mentioned by Simone):

- Perform test in order to qualify the procedure assembly on aluminum prototype (in Milan).
- Then with the CF prototype perform the test in Frascati. Not only for the welding but also to verify all the assembly steps.

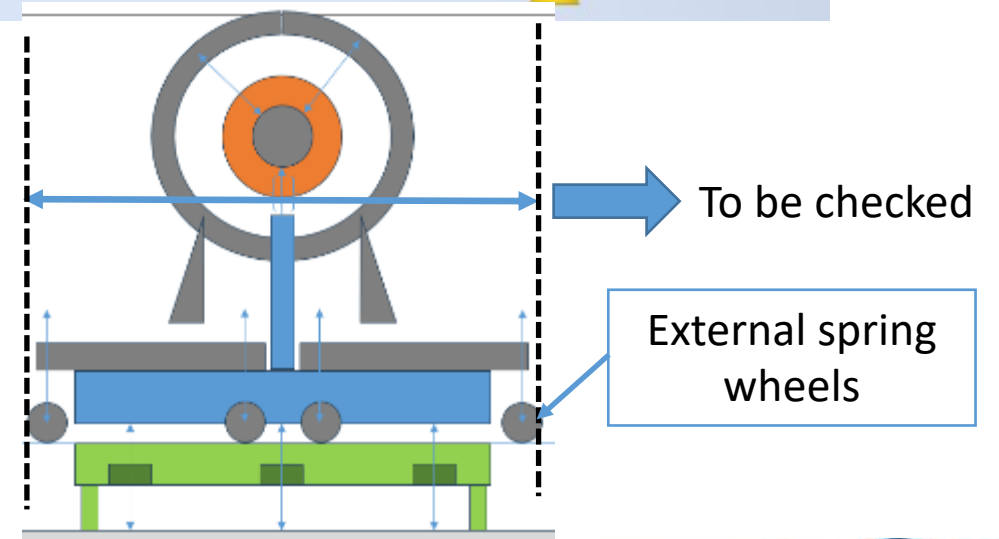
Functional test in climatic Chamber

Functional Test in Climatic Chamber



Under Study:

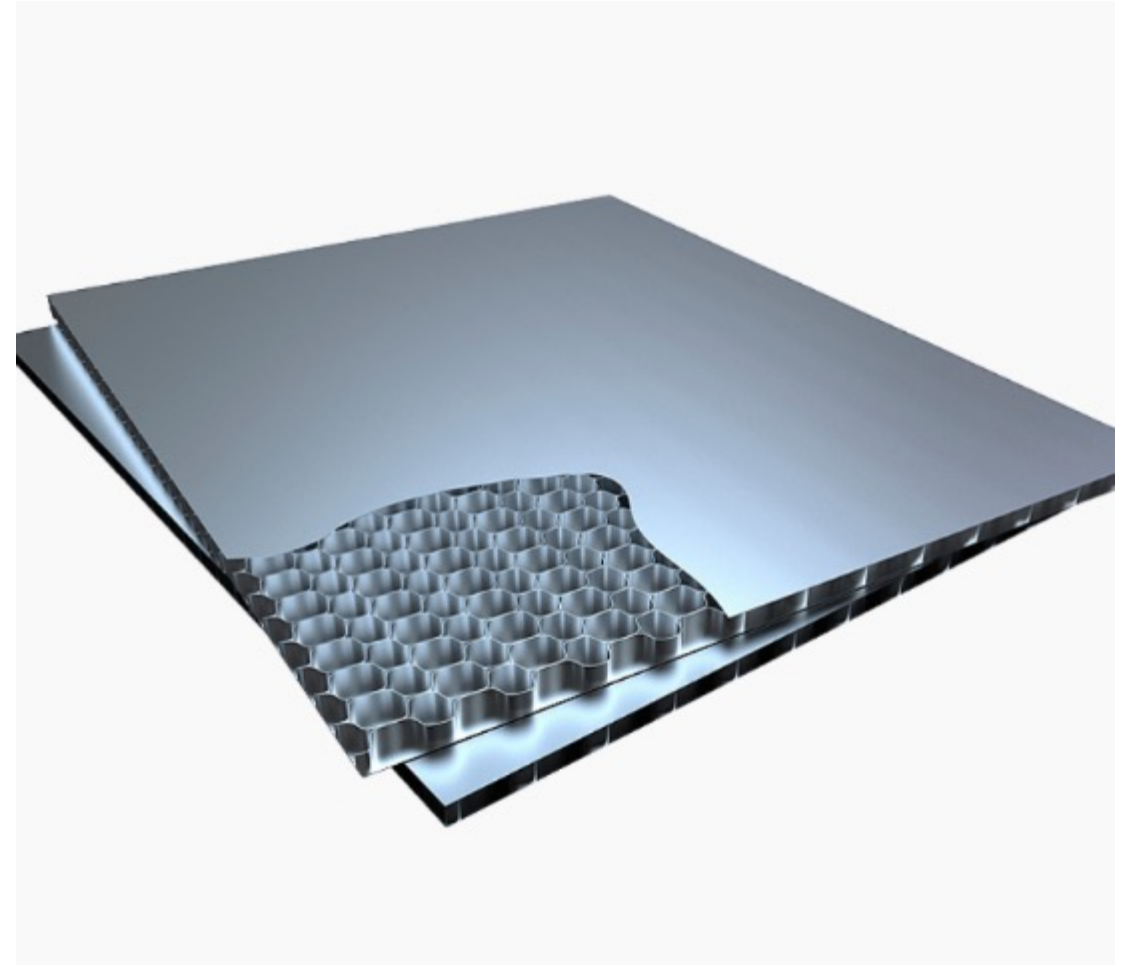
- To do a platform and position it over the existing one in order to:
 - avoid to leave a big hole in the floor when system is moved to the CC
 - avoid 20cm of lifting (only few millimeters)
 - same tool as in Liverpool
- Passive and active pillars (only active shown in the pictures) passing through the existing platform
- Embedded wheels or external spring wheels (not clear if it fits in CC)

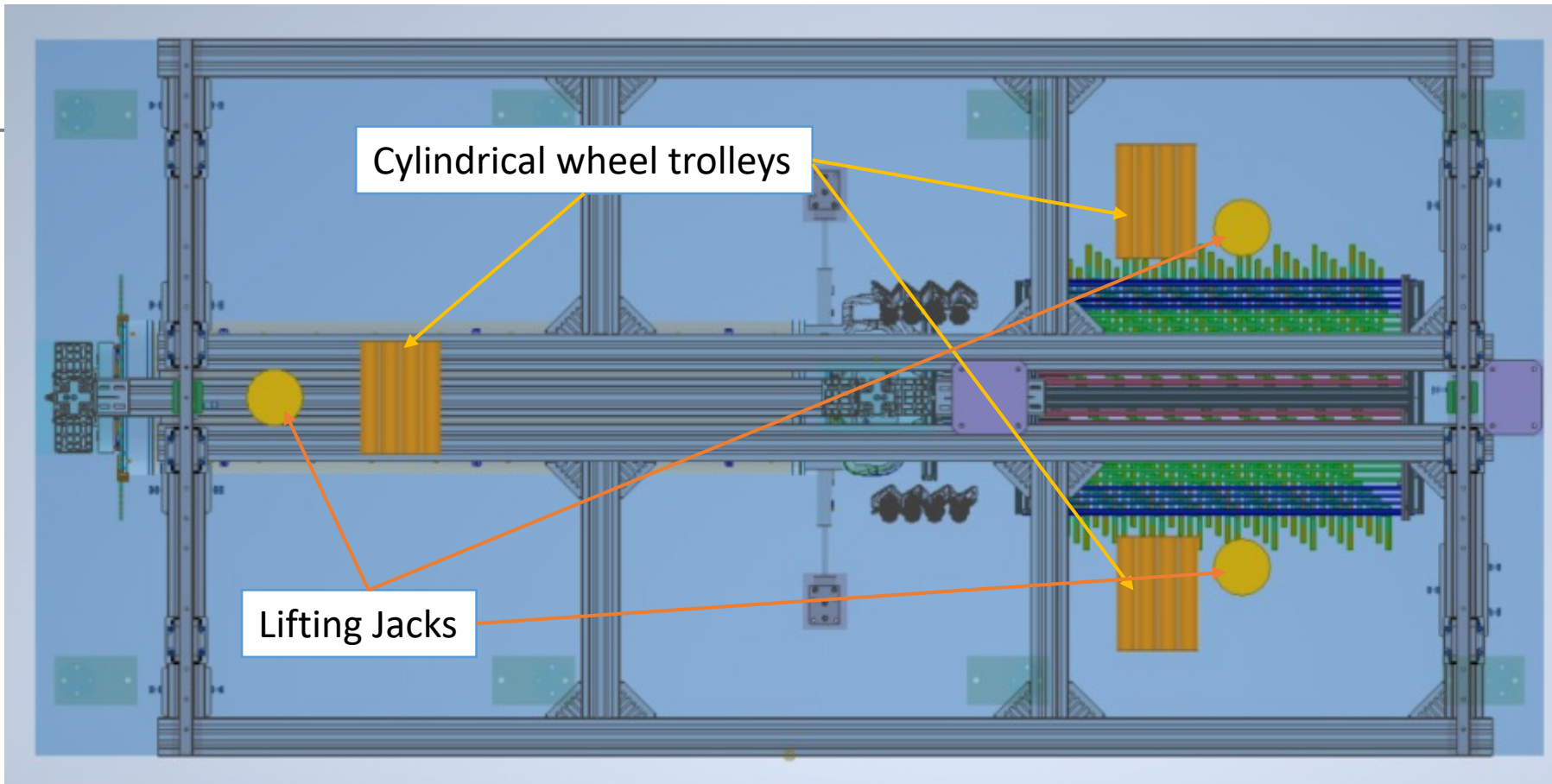


2 companies

<https://www.cel.eu/>

<https://www.confimibergamo.it/cospal-compositer-srl.html>





- Synchronized electric hydraulic jacks. We used a lot for the lifting of Kloe experiment.
- Pivotal wheel
- Calculation of center of mass in order to find the best jack's position limiting the stresses
- Use of the load cells for the load transfer from the "Assembly position" to the jacks and then on the wheel trolleys



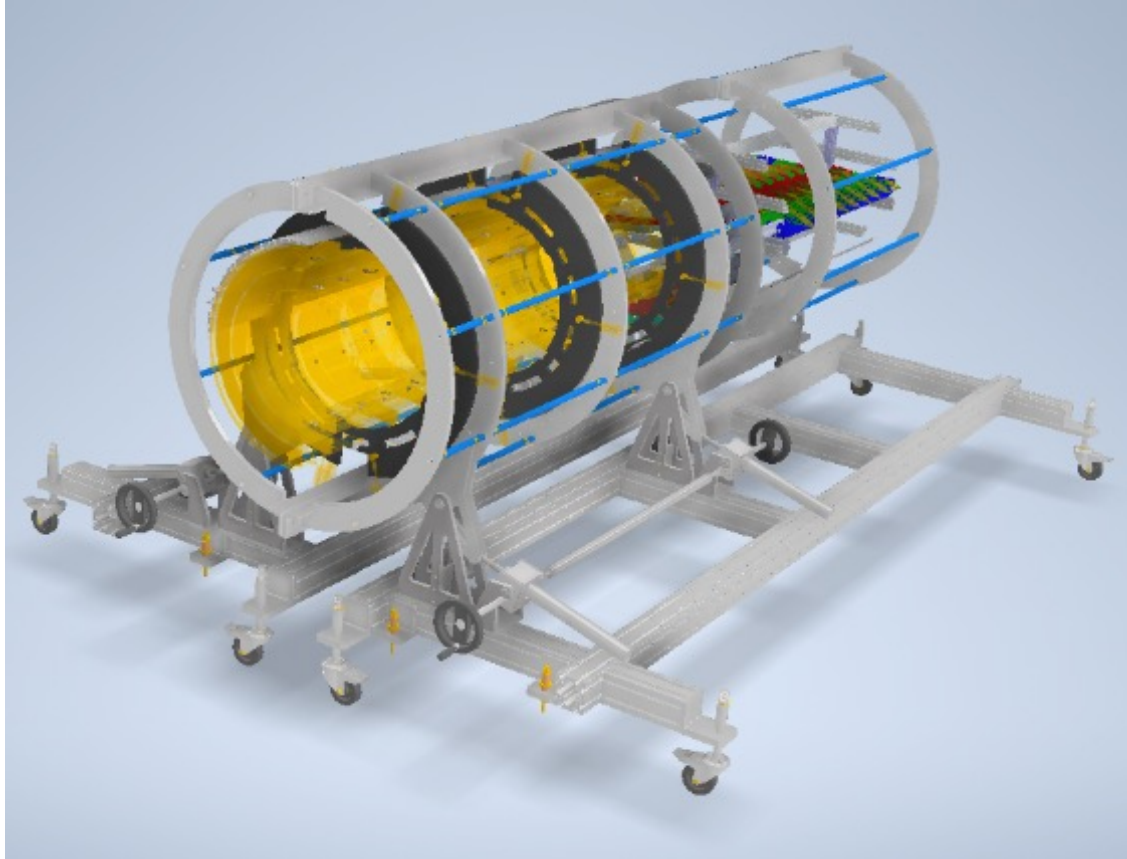
The use of the new platform involves the lengthening of the bar and the addition of 2 wheels (one per side), which must be dismantled as soon as the trolley move out from the platform in order to fit in the Climatic Chamber.

Action:

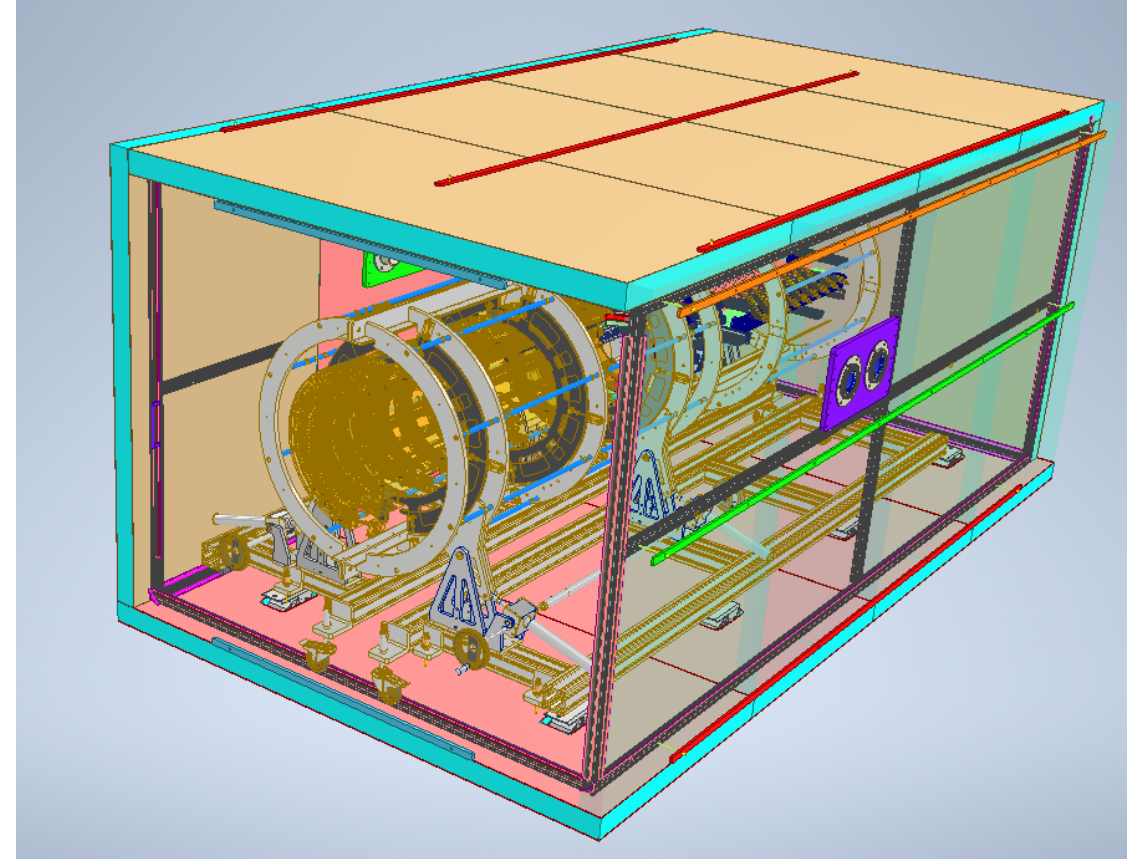
- Check the CAD model be consistent with real object;
- in order to have a better knowledge of the assembly trolley we need to "play" with it, by using some fake or real Half Shell, not yet in Frascati
- We started to think some solution. We have to converge soon in one direction;

Shipping

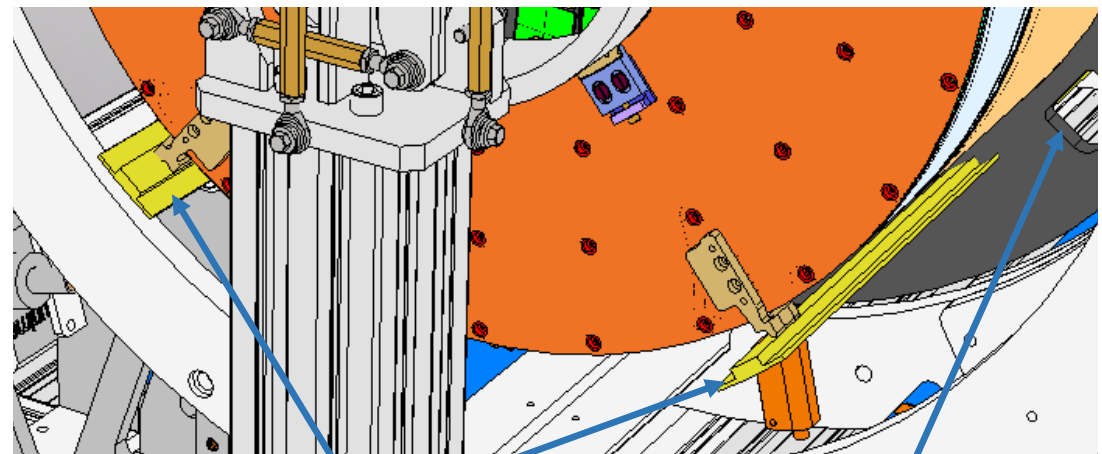
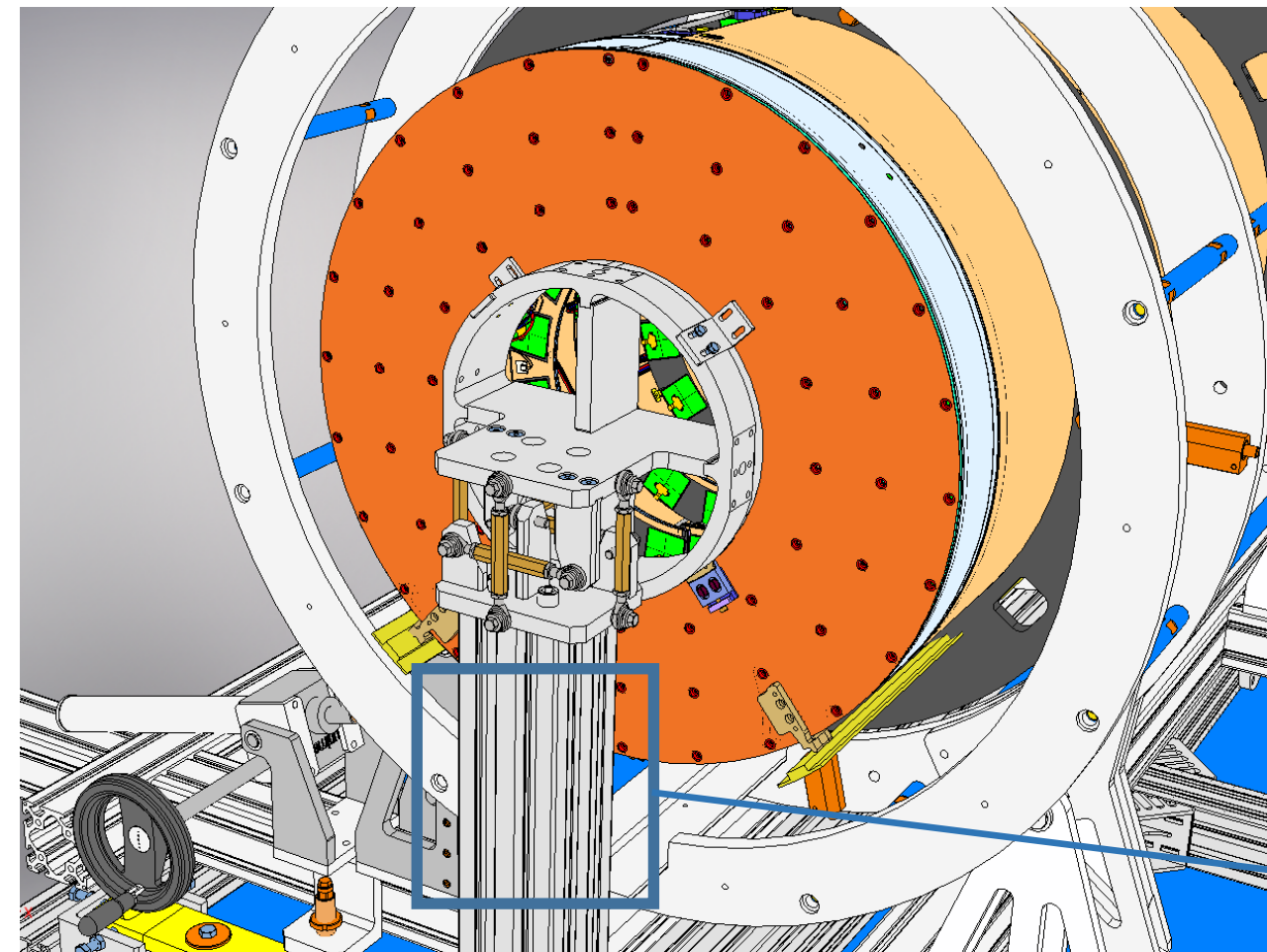
Wheels are out of the room of the box, so we have to mount the lateral and upper panel, after the fixing of the trolley on the basement.



A trolley easy to move with load on the rails and compatible with the transport box.



Fixed to the dumped basement, remove the wheels. Once in CERN and after the test the wheels are mounted back.

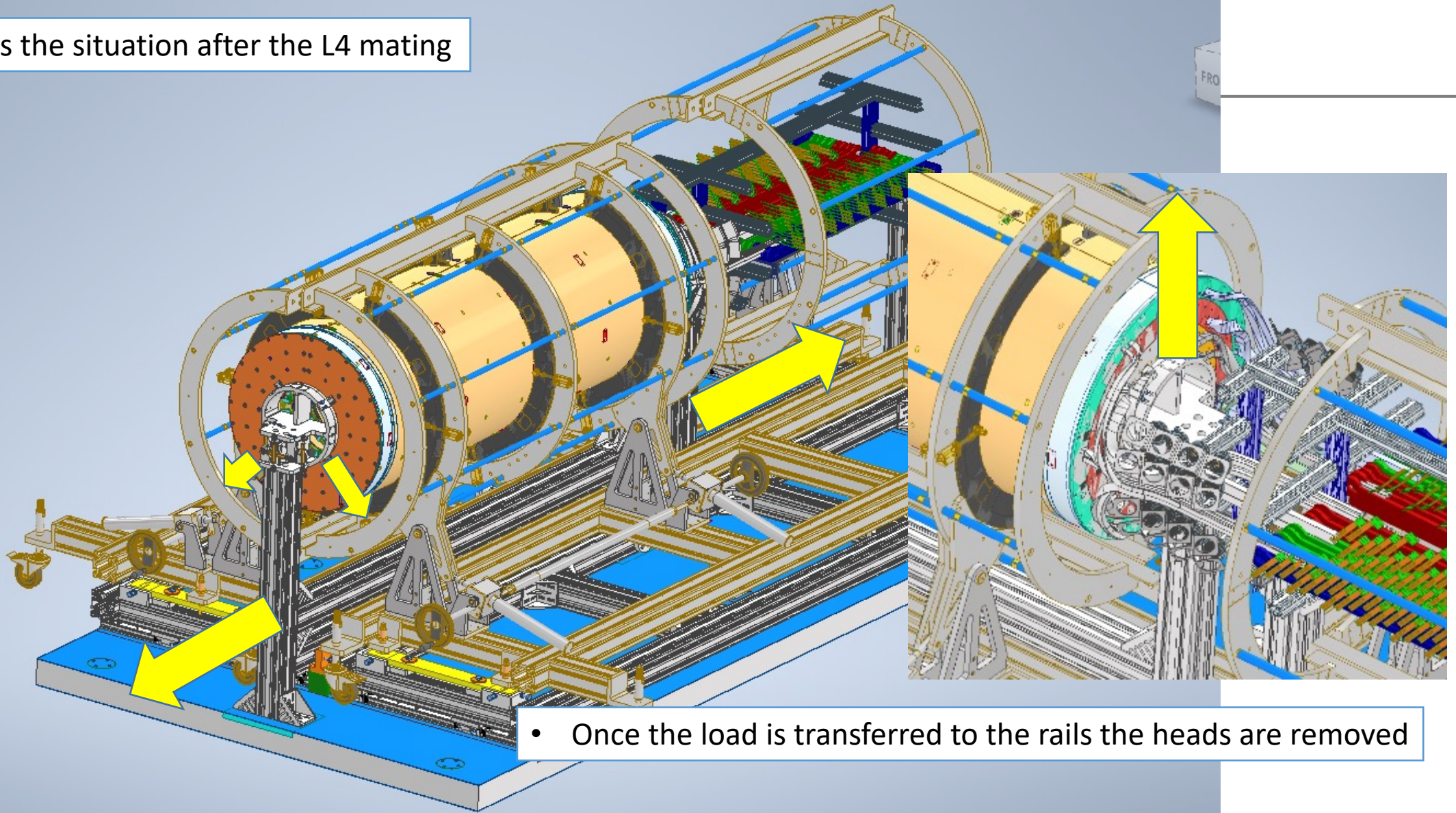


Not real rails – who is the contact for the final design?

Design of the CF flange in order to include the rails, or think to have another support to holding them

Modification in order to have a system to switch the load, from the Head to the rails.

This is the situation after the L4 mating



- Once the load is transferred to the rails the heads are removed

Action (very similar to the previous item):

- Check the CAD model be consistent with real object;
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- We started to think some solution. We have to converge soon in one direction;