

HalfShell Clamping, Cycling and testing in Liverpool (all Layers)

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Liverpool LSDC

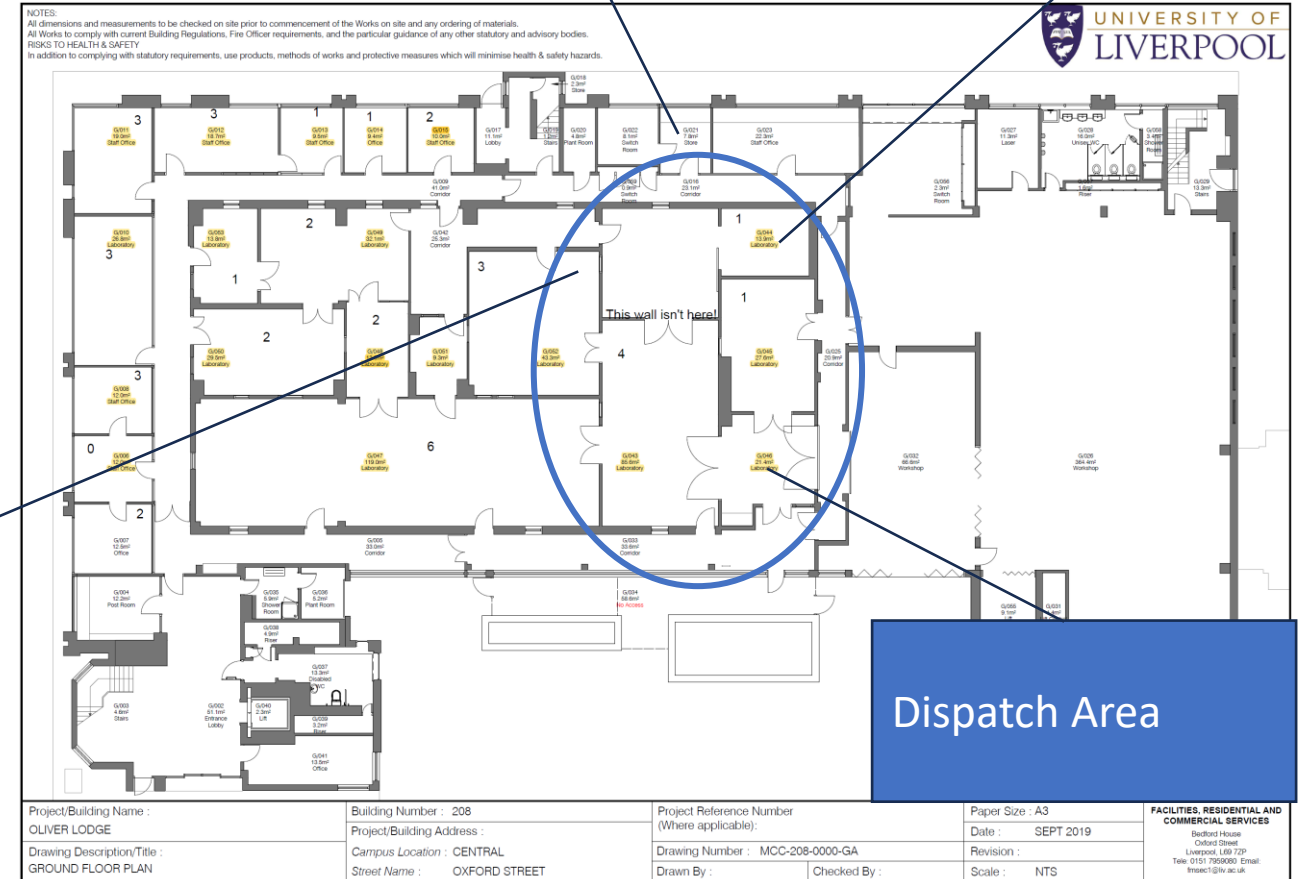
- Liverpool LSDC has several rooms, which will be used for different activities.
- We are limited on space, with no room to expand.

Lukasc Plant Room

Environmental Chamber

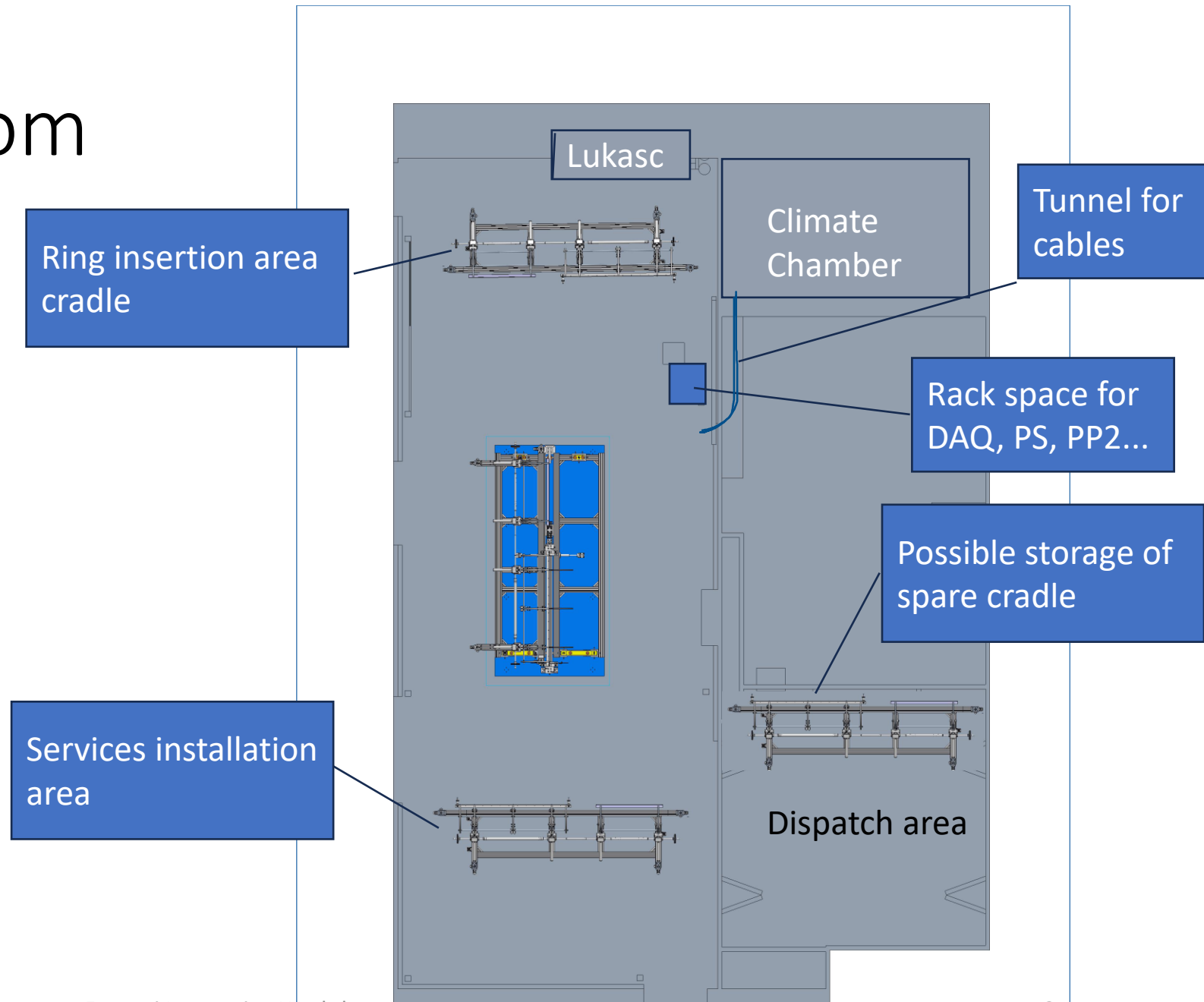
Half ring reception

Dispatch Area



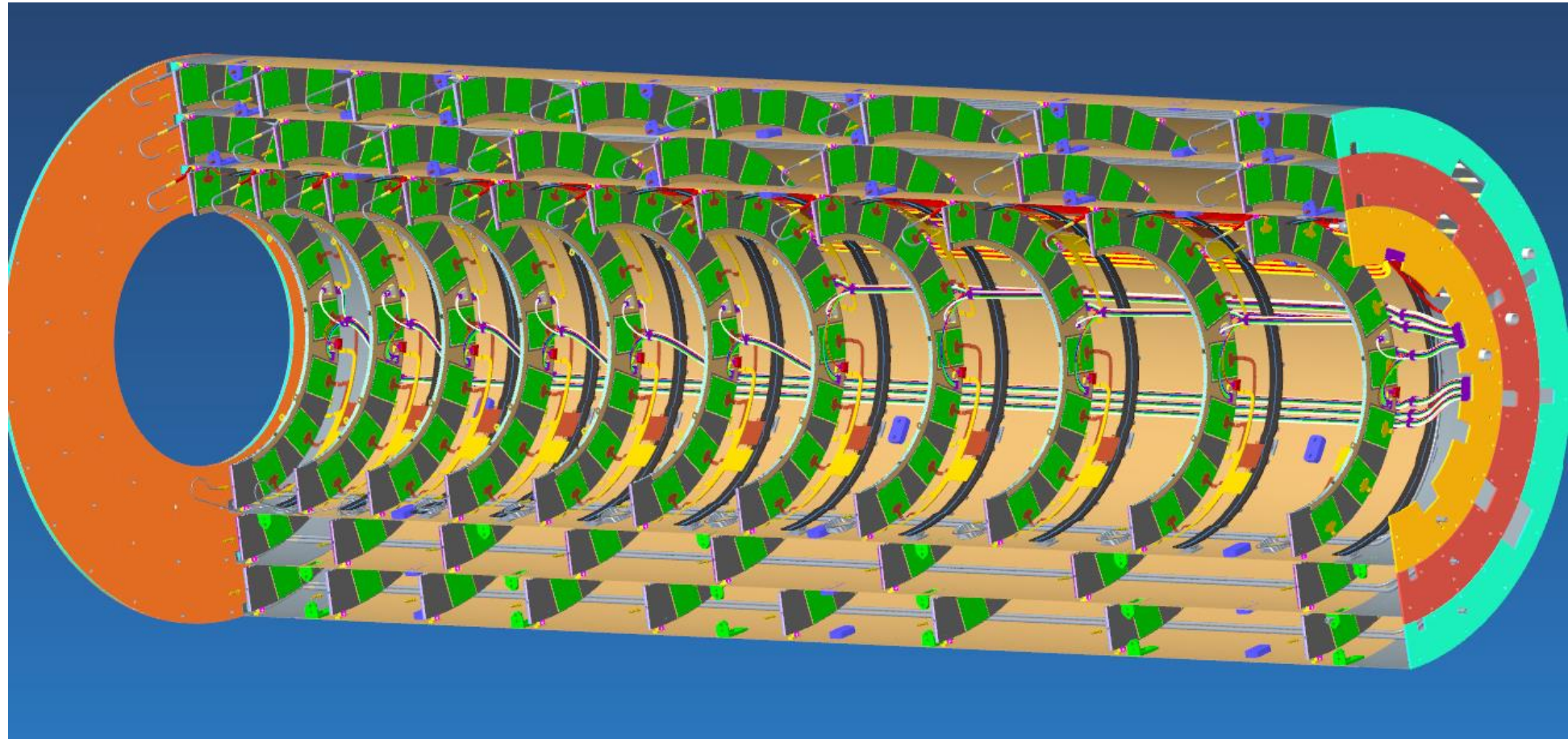
Map of clean room

- Space inside cleanroom is limited
- Assume we have 4 cradles to maintain schedule
 - i.e. if L2 rings are late we can proceed installing L3 services..
- The ring insertion area is close to climate chamber for easy access.
- Exact placement of the central integration support tool is needed to ensure space to transfer cradles from “service-area” to “ring-insertion area”
- **The full blue-base and central station can not move until its conversion into the transport box.**

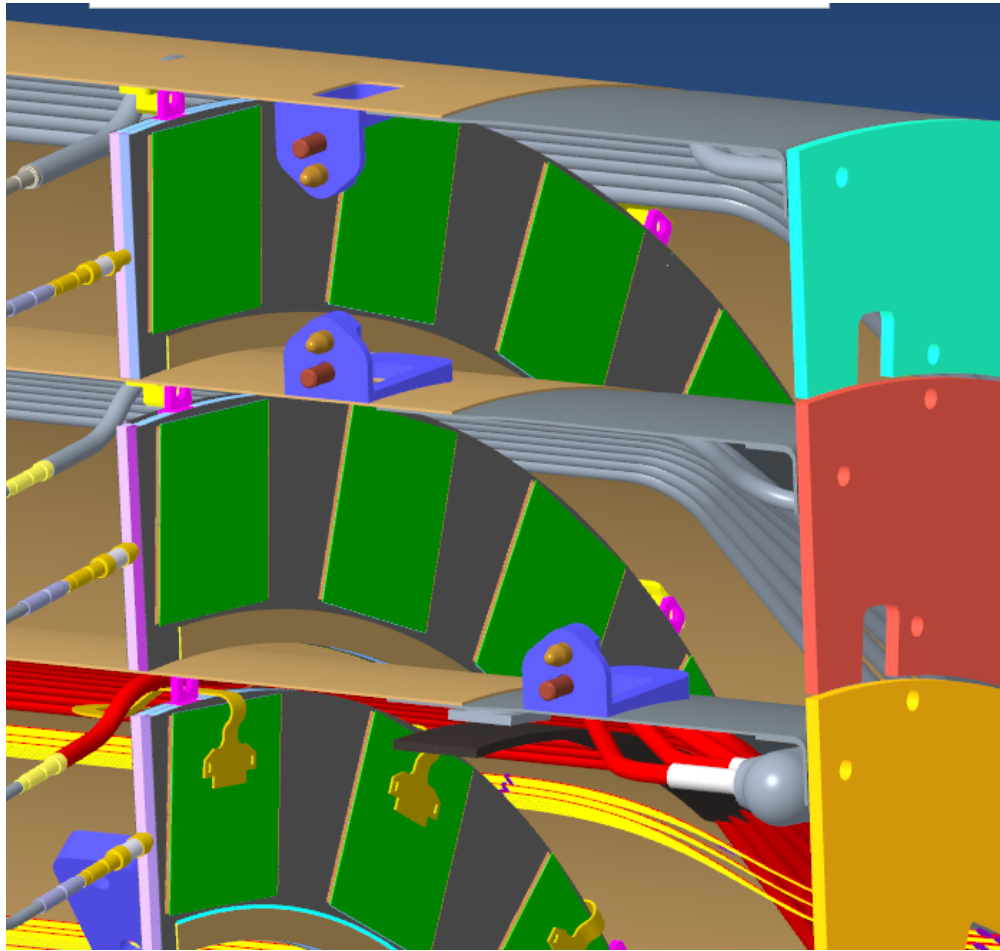
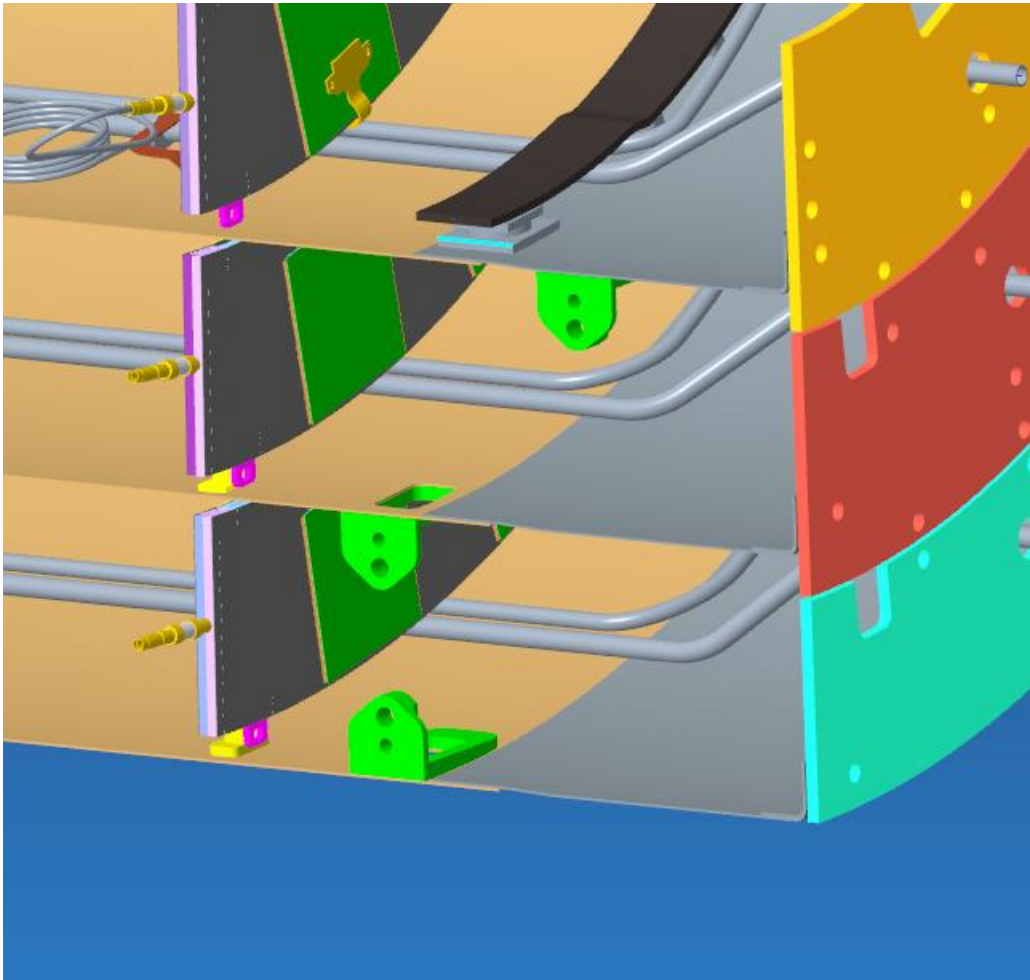


Clamping layers together

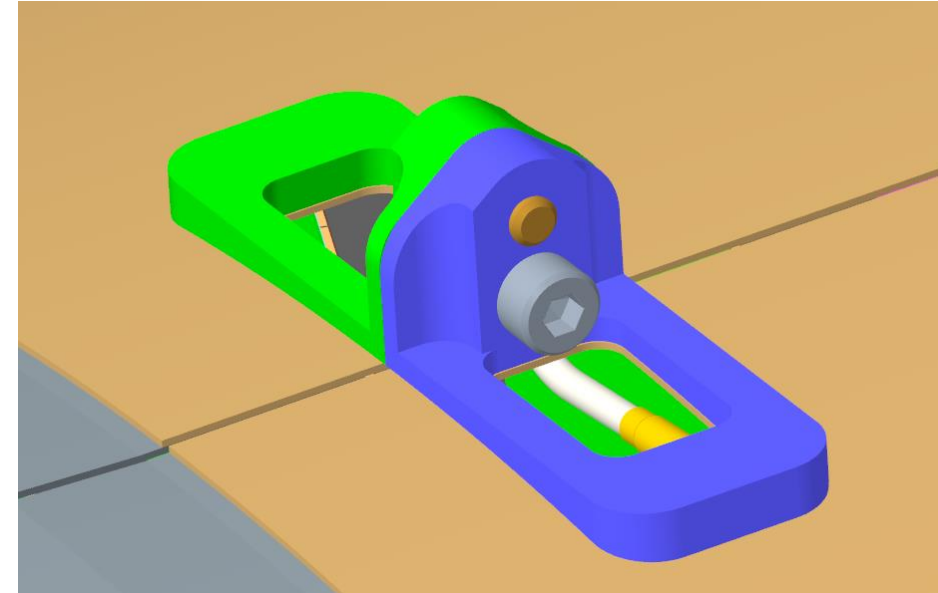
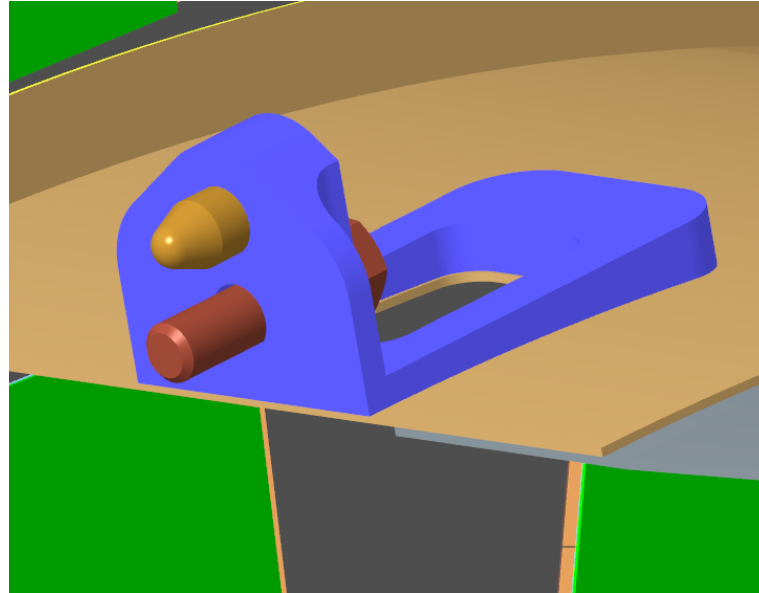
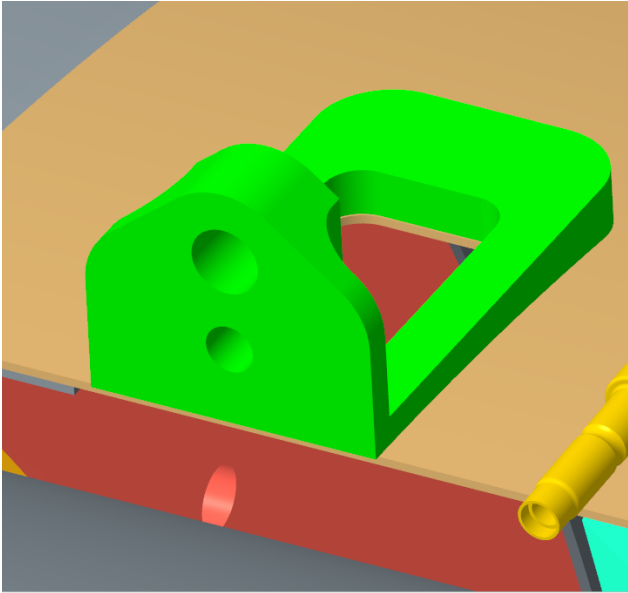
12 connectors per Layer
L2/L3 connectors on outside
L4 connectors on inside



Zooming in....



Detail....



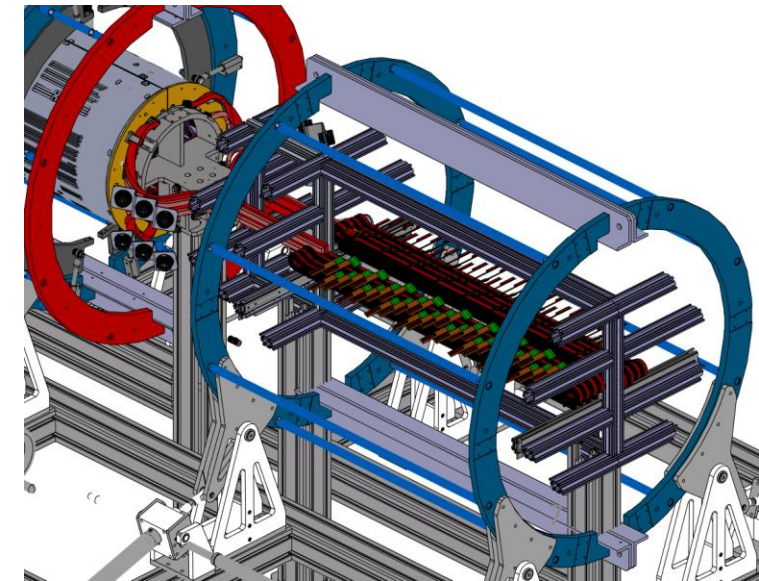
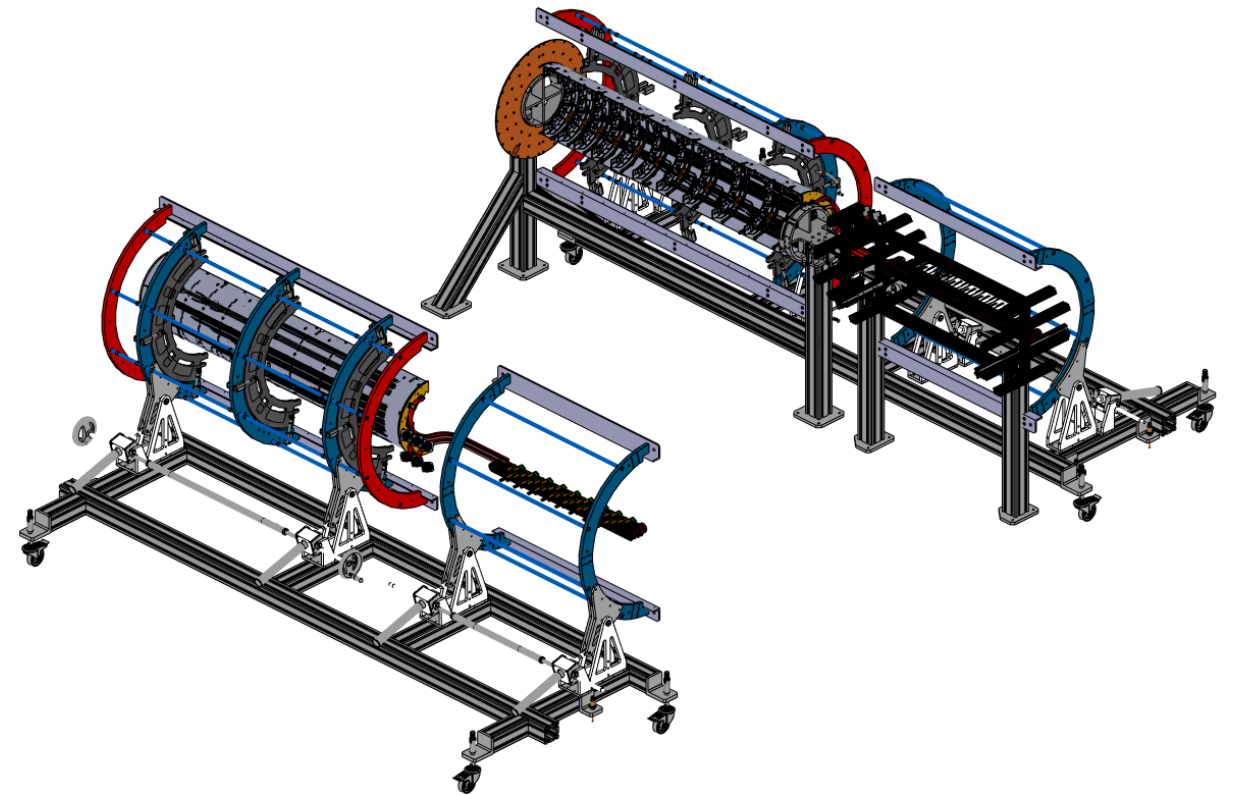
Can cut-out in cylinder only required for L4

A bespoke tool is needed for L4 where connector is on the inside

Could cut-out be used with endoscope to help spot issues during alignment?

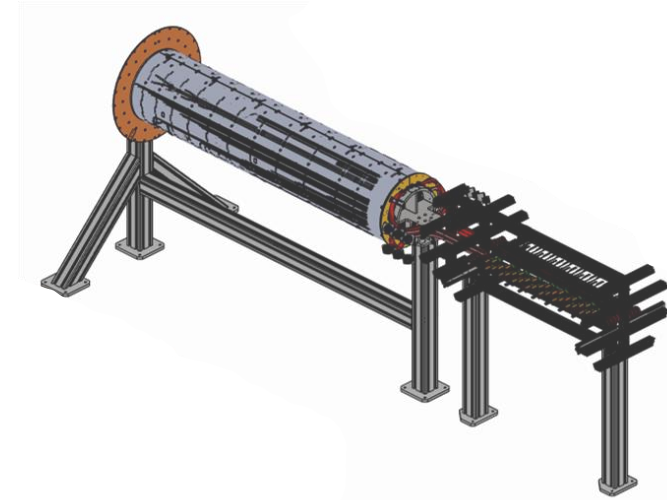
Mating of half-shells

- Testing of mating of bare shells already occurred
- Move both LH and RH trolleys to central assembly
- Check alignment with laser tracker.
- Services transferred separately to services trolley
- Connectivity warm-test with LP
 - 1 module per SP
 - To be demonstrated LP + convective cooling works on closed layer
 - Option: to test whilst layers are a few cm apart? (but after services transferred).
 - Does this teach us anything?
 - Does the service cradle move (rotate) independently to half cylinder cradle?



Can we cold test each mated layer?

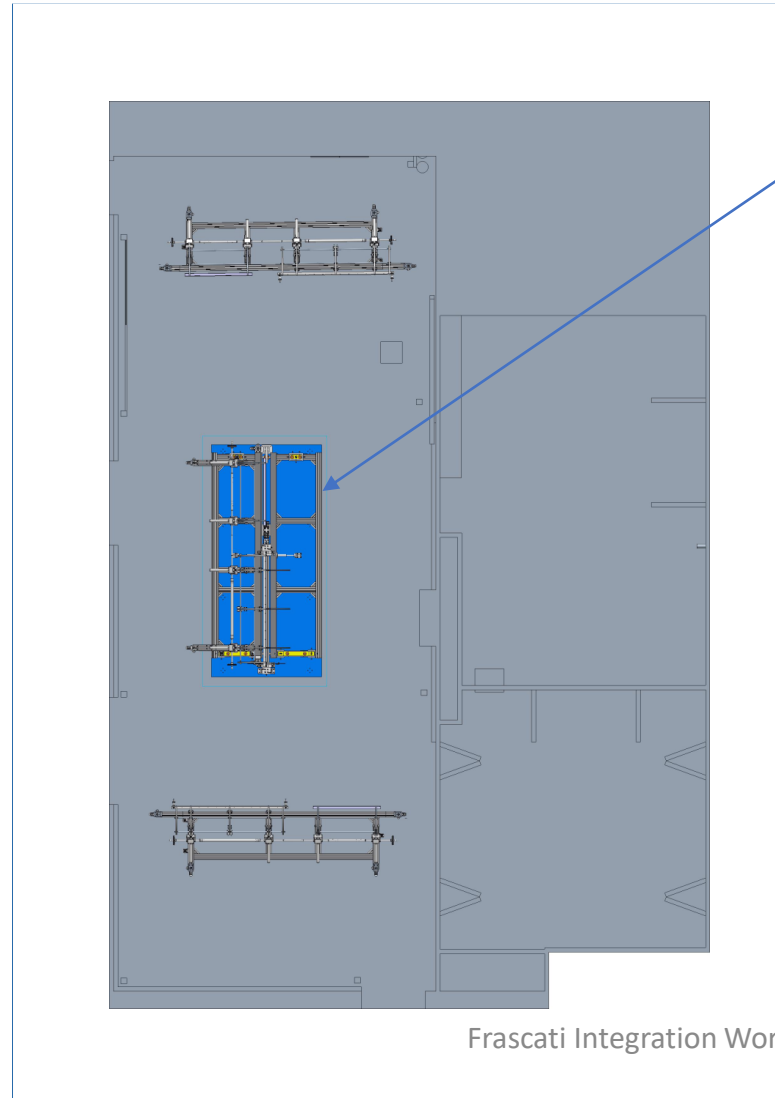
- If we wanted to cool with CO₂ at T_{ev} ~ +15C
 - Check distance from Lukasc
 - ~7m
 - Or auxillary chiller?
 - Only possible to chill environment inside enclosure
 - Possibility of secondary “tent” enclosure with dry air.?
 - The enclosure has to be within footprint of blue base
- Need to incorporate time into schedule to construct enclosure per layer



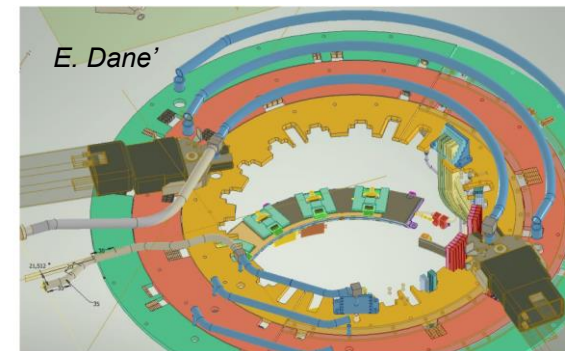
Complete layer ready

Orbital welder:
Swagelock M200

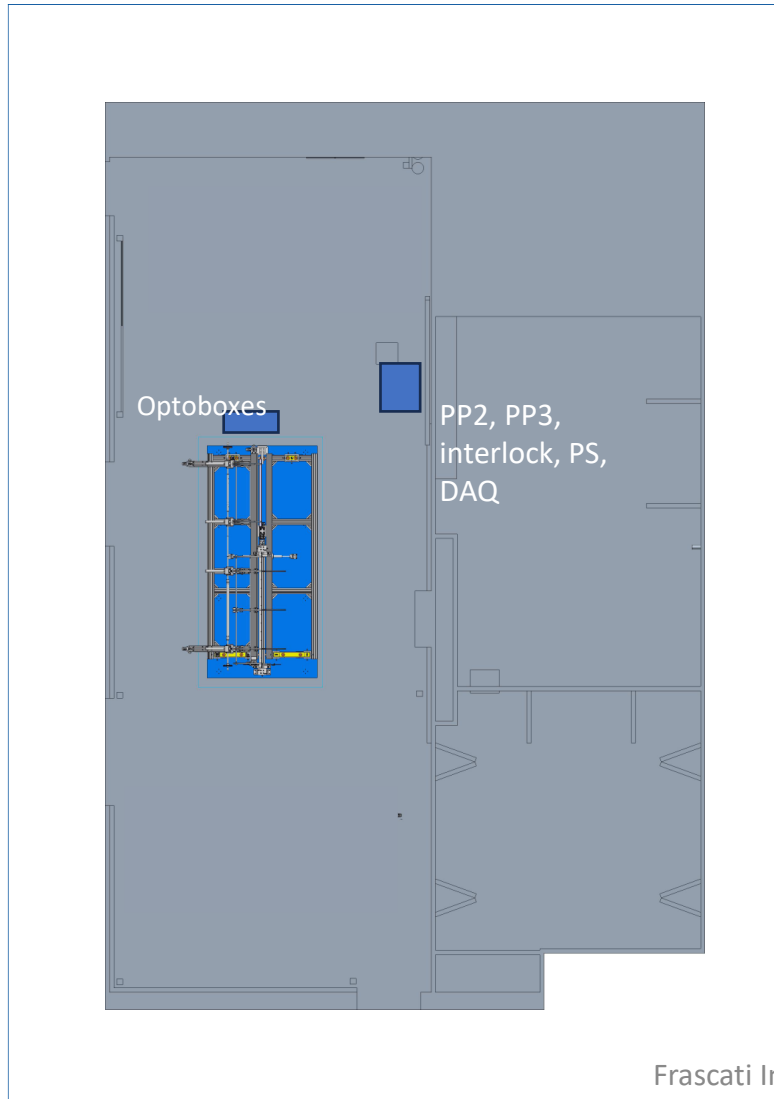
Q: how exactly to
leak test?



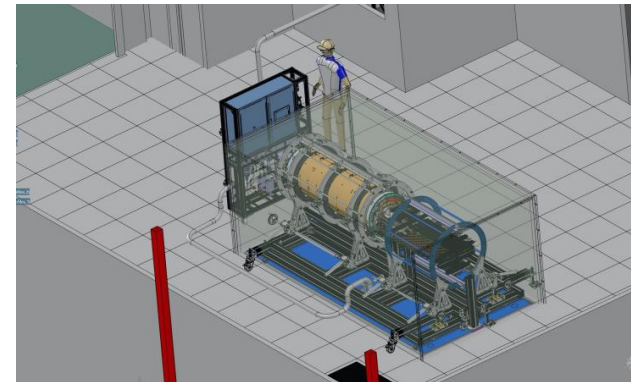
- Move trolley in the mating area
- **Weld the manifolds of the individual HS here**
- Leak test
- Pressure test 162 bar
 - Compressed Dry Air/Argon (TBD)
- Leak test



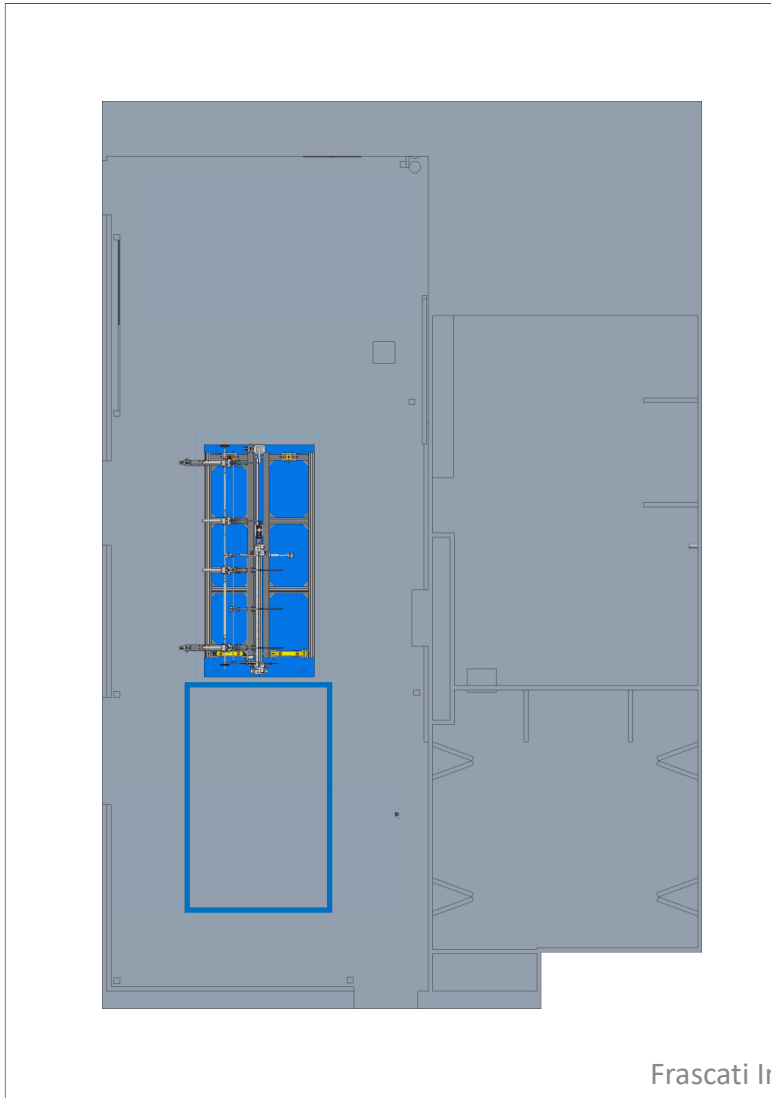
Completed Endcap



- All manifolds are welded → CO₂ flux reduced by 2
- Final reference warm test to be compared with reception test at SR1:
 - *Low power mode: To be demonstrated that LP + convective cooling works on closed layer*

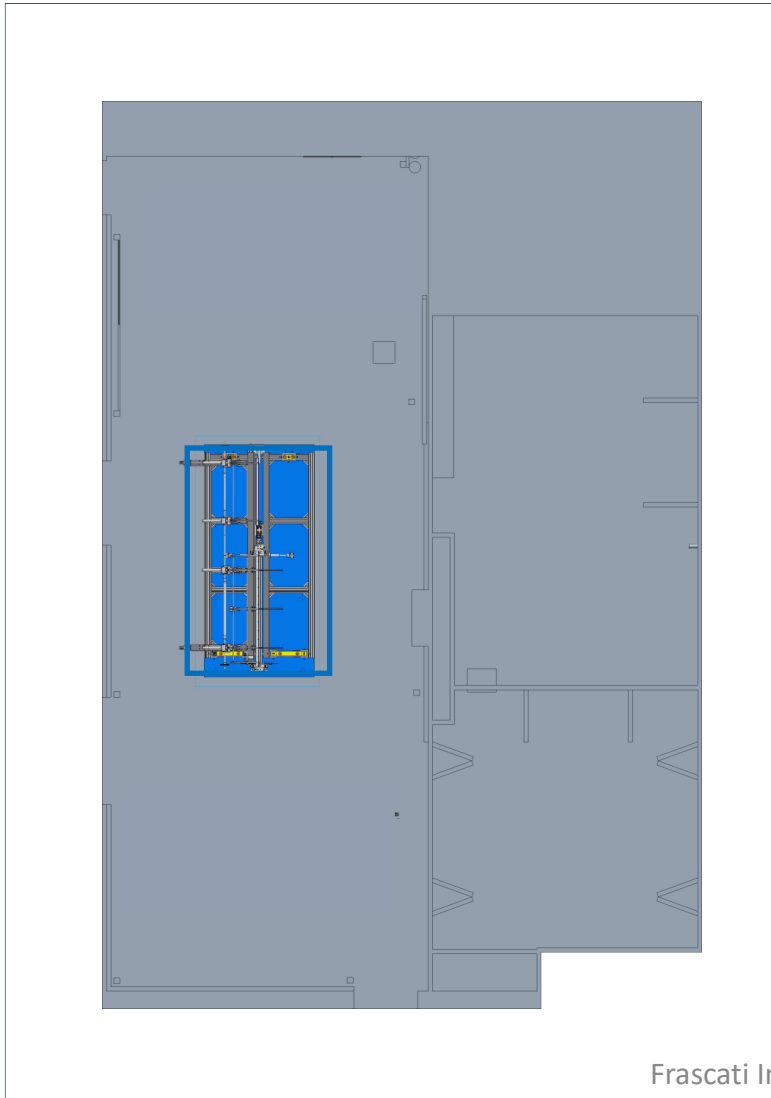


Dispatch



- Transport box to be built around EC and blue-base (blue base is floor of transport box?)
 - LxWxH=4250mmx 2200mmx 2000mm
 - Dispatch doors 3000x3000
- Slide transport box into LSDC via airskates
 - Jack end cap up
 - **Design for blue base must incorporate recess and/or fixings and qualified for toe-jack lifting**
- Slide transport box base under EC
- Blue base coupled to transport box via coupling springs
- Construct shipping box around EC
- Use air-skates to transport to loading bay
- Forklift (from shipping company) loads into truck.
 - Alternative workshop crane (check ceiling height).

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