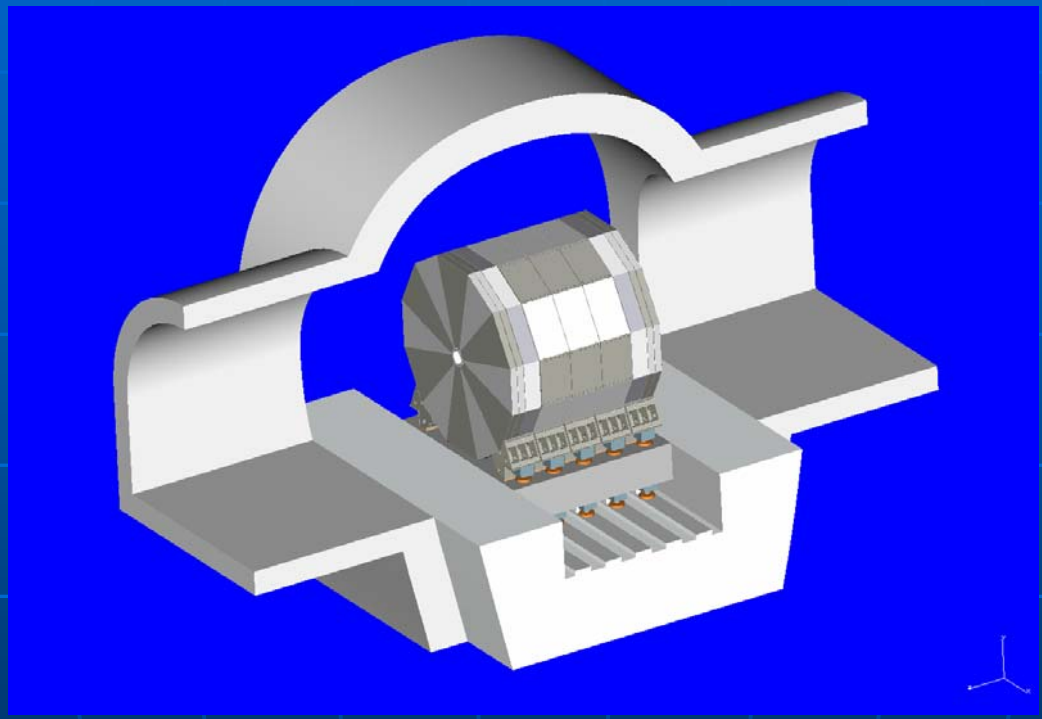
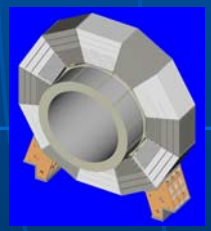
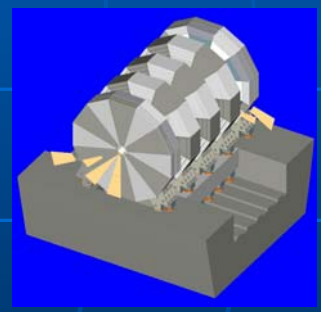
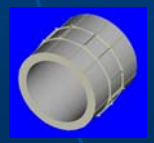
# The ILD - Barrel, End Cap and Cryostat integration

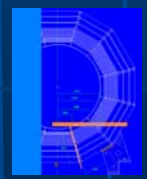
## - current design with 8 meters beam height -











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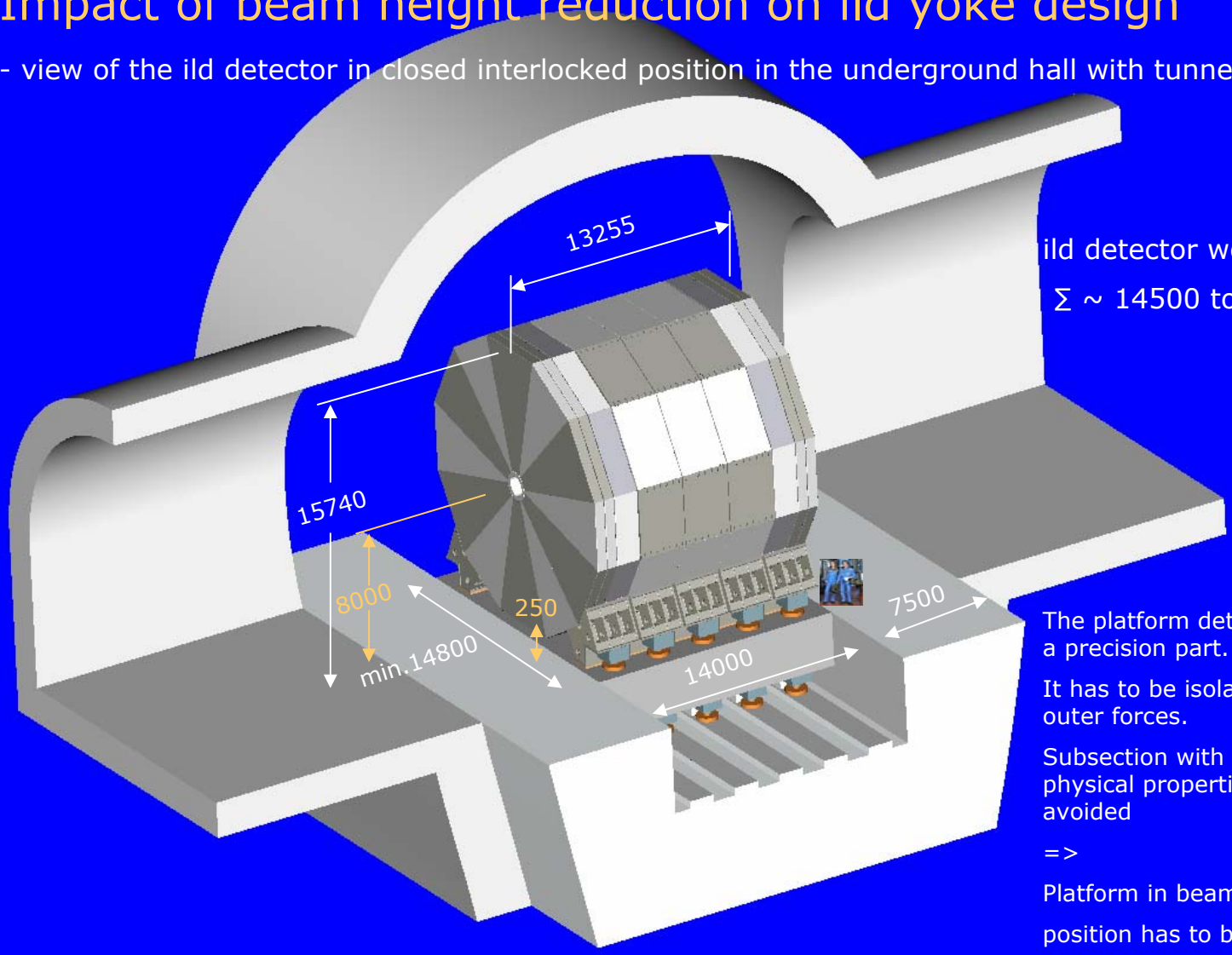
# Impact of beam height reduction on ild yoke design

- view of the ild detector in closed interlocked position in the underground hall with tunnel




ild detector weight

Σ ~ 14500 tons

The platform detector unit is a precision part.

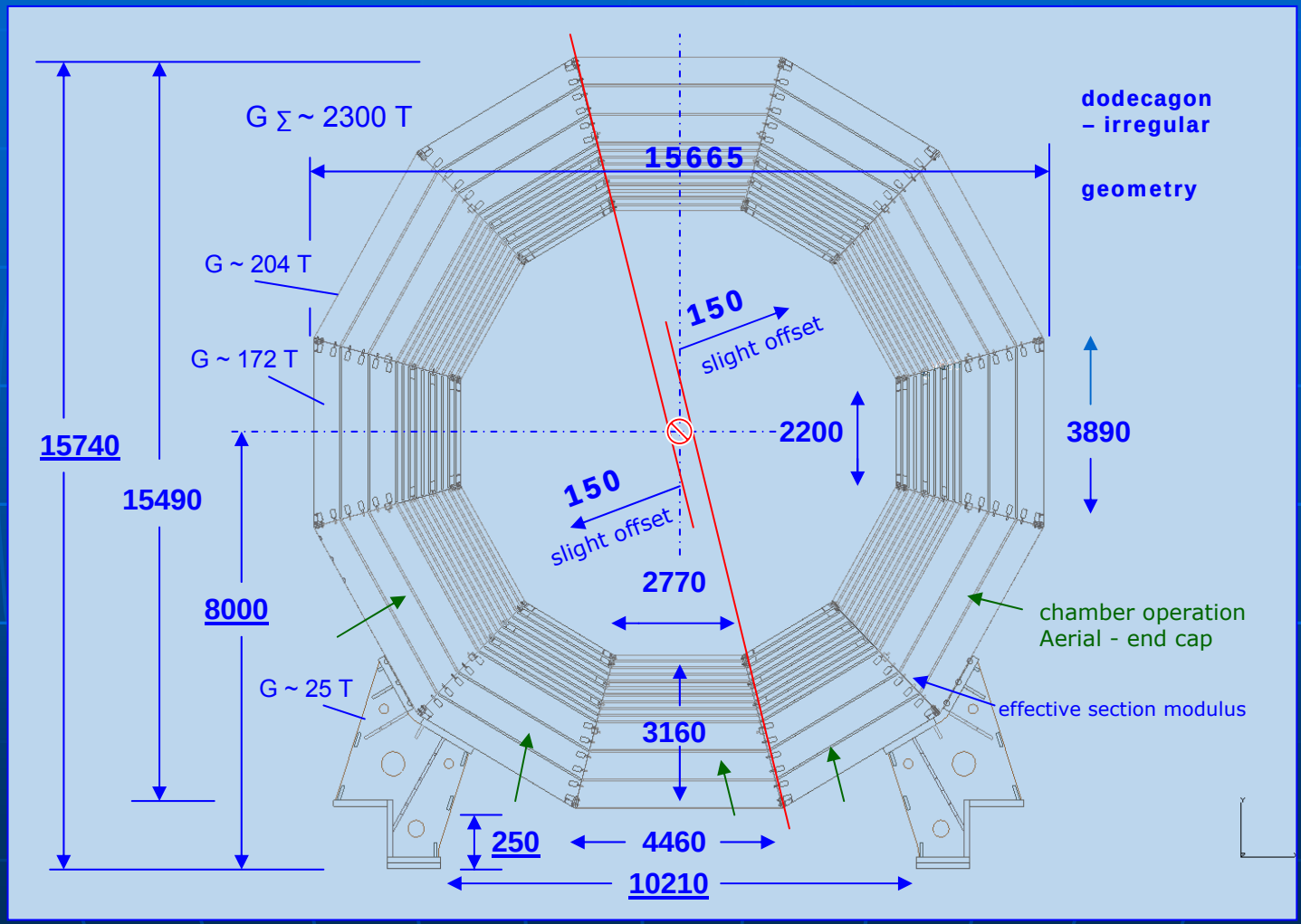
It has to be isolated from outer forces.

Subsection with different physical properties are to be avoided

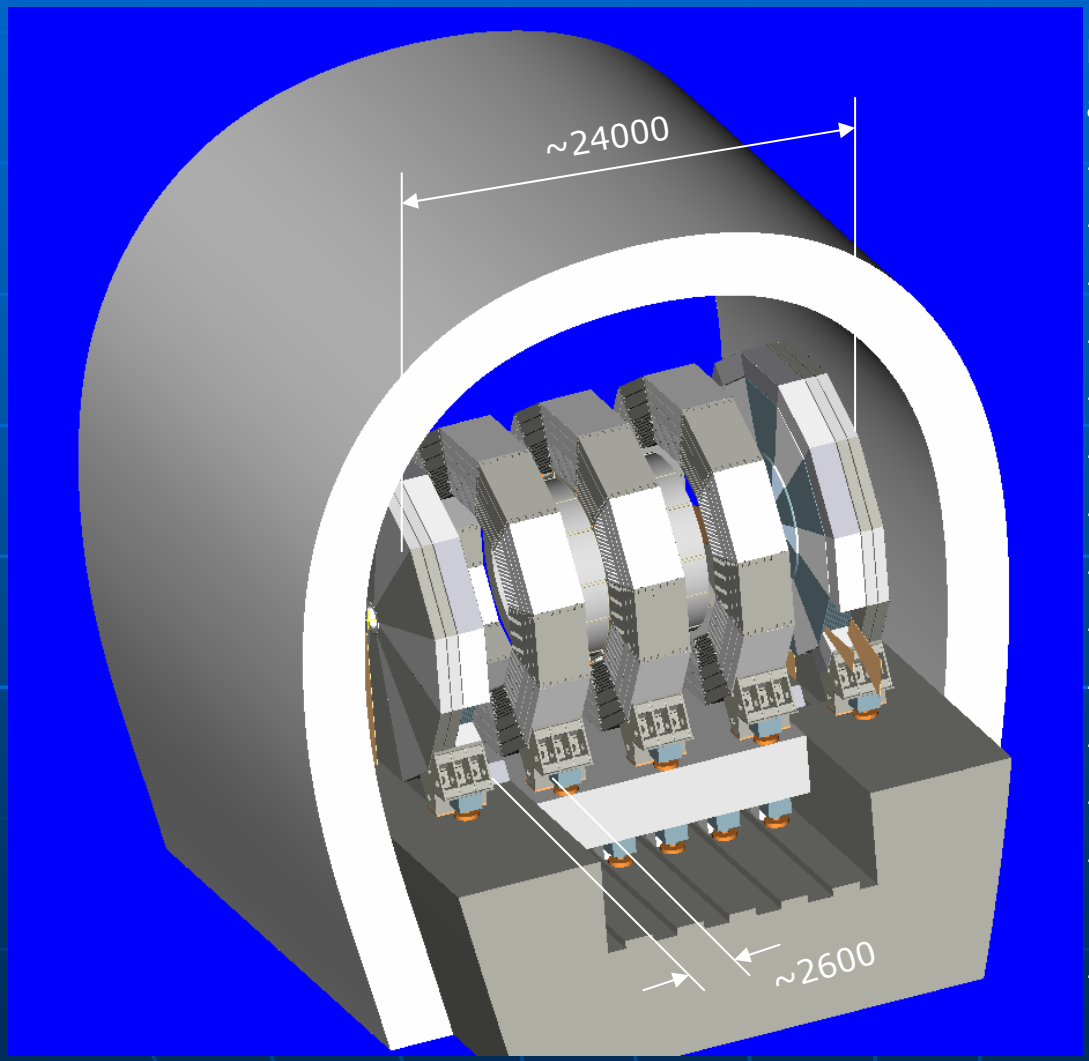
=>

Platform in beam position has to be locked.

# barrel geometry / dodecagon have irregularly geometry - slight offset 150 mm



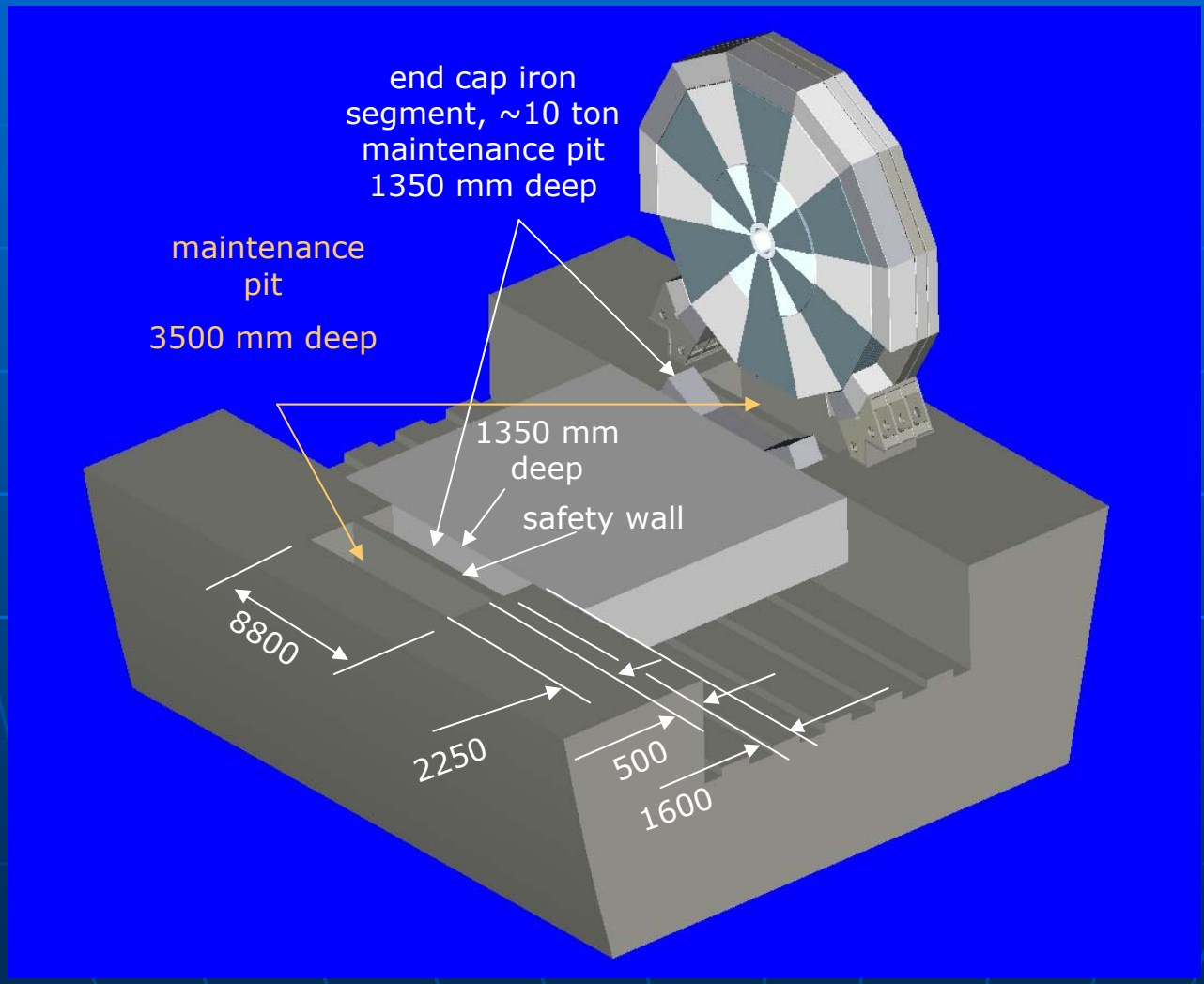
# Overview of the detector / shut-down time in the hall




Hall for detector and acquirement required area estimate:

- escape route
- service operation
- scaffolding
- ladder
- cables
- cooling and gas system
- crane and movable device
- distance to crane working aerial
- operation tunnel for the chamber
- platform position locking safety system
- radiation shielding wall
- interlock set system
- general safety system (smoke-, gas detectors, fire fighting service…)
- light and more…

# ILD platform and hall fundament




End cape iron segment in low-angle shot:

automation operating be hydraulic cylinder, electric motor or lifting jack

All other segments positioning with hall crane

chamber pit:

manual with scaffold and leader

Platform is positioned and safety lock is applied

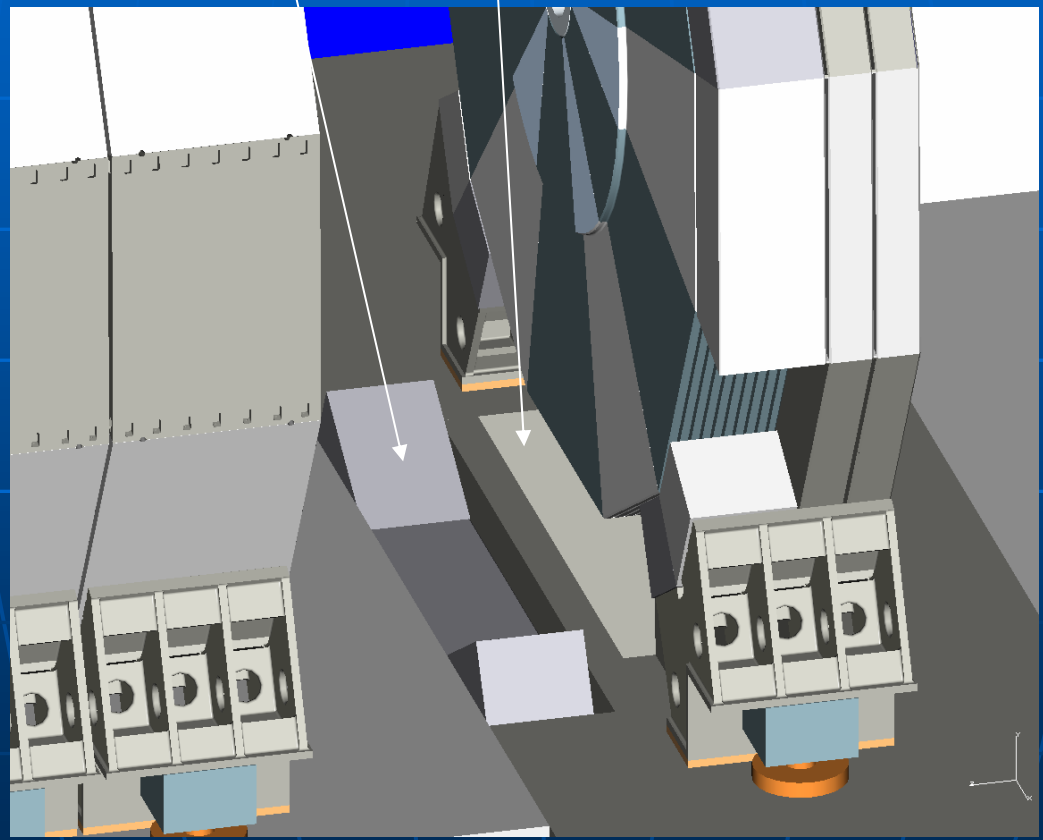
# Chamber dismantling at shut down

Step 1: remove end cap over maintenance pit 1

lower iron (automatic with stroke jig)

Step 2: remove end cap over maintenance pit 2

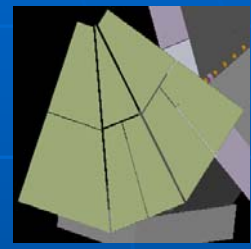
change chamber (lifting jig and manual)

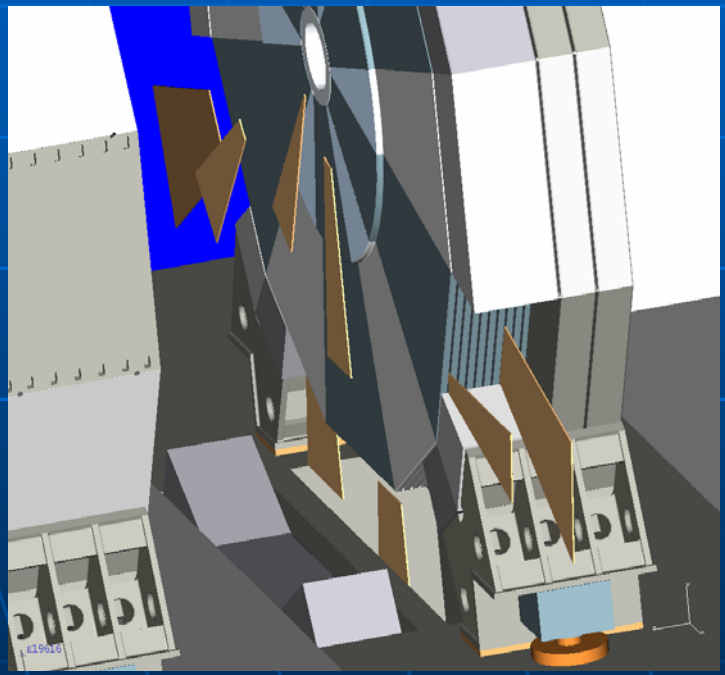


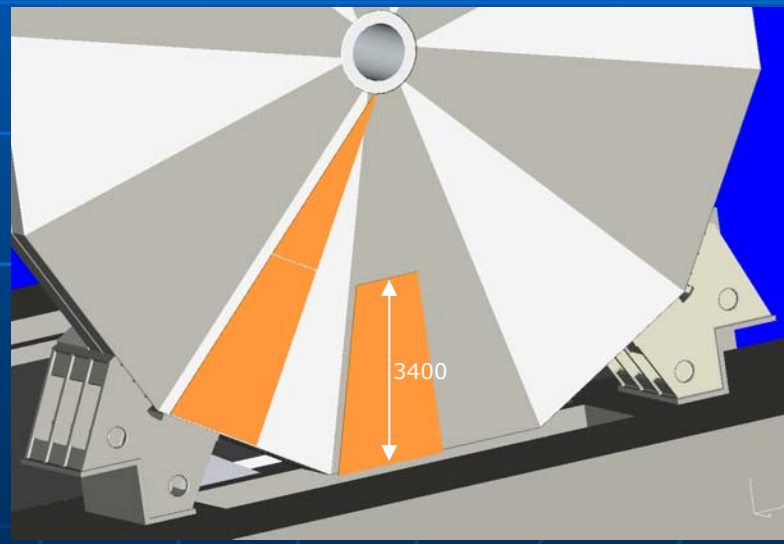
# Chamber Assembly End Cape

chamber assembly practical only for 2 or 3 segments

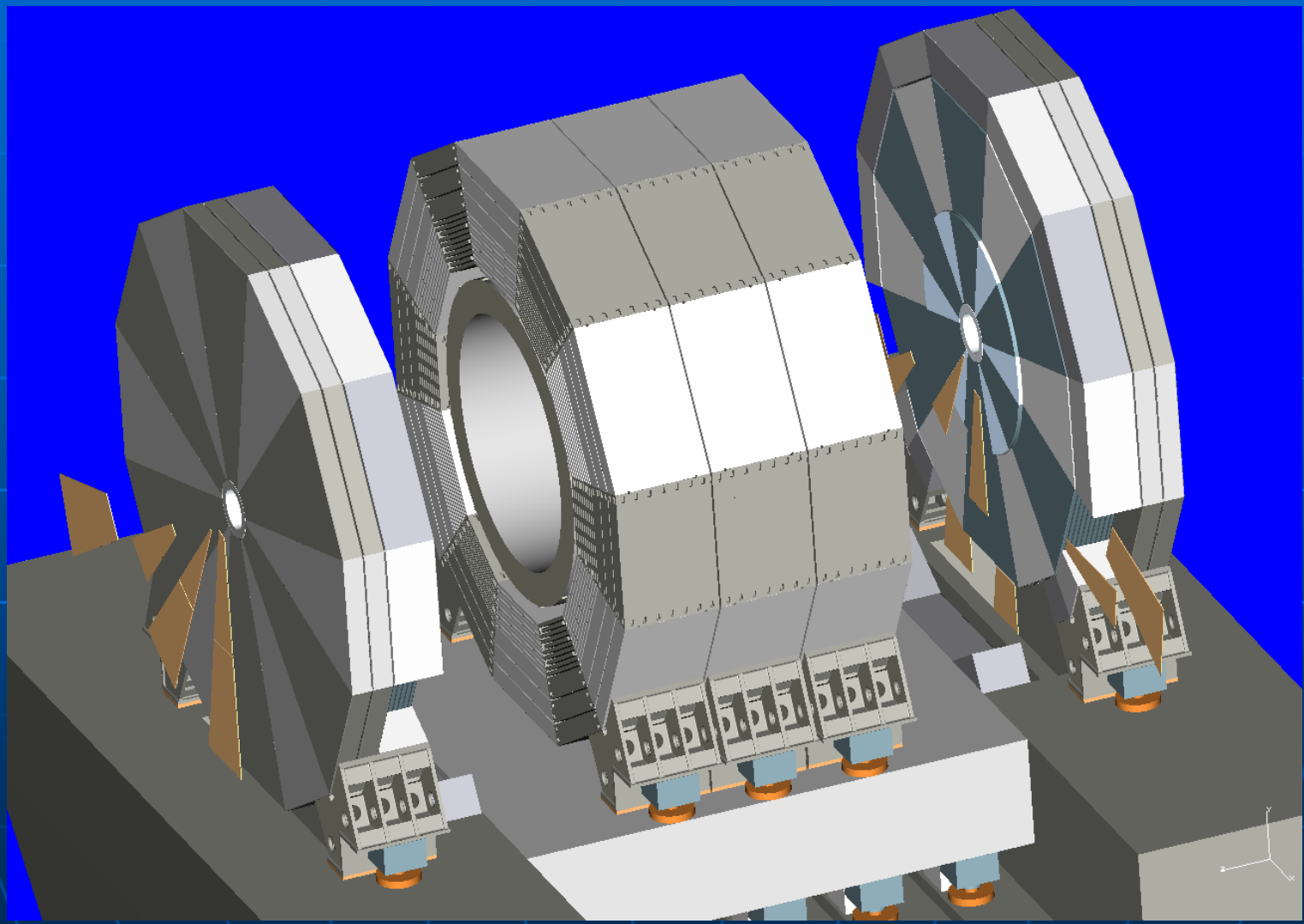
Geometry: ~3400 x ~2200 x thickness between 25~30 [mm]



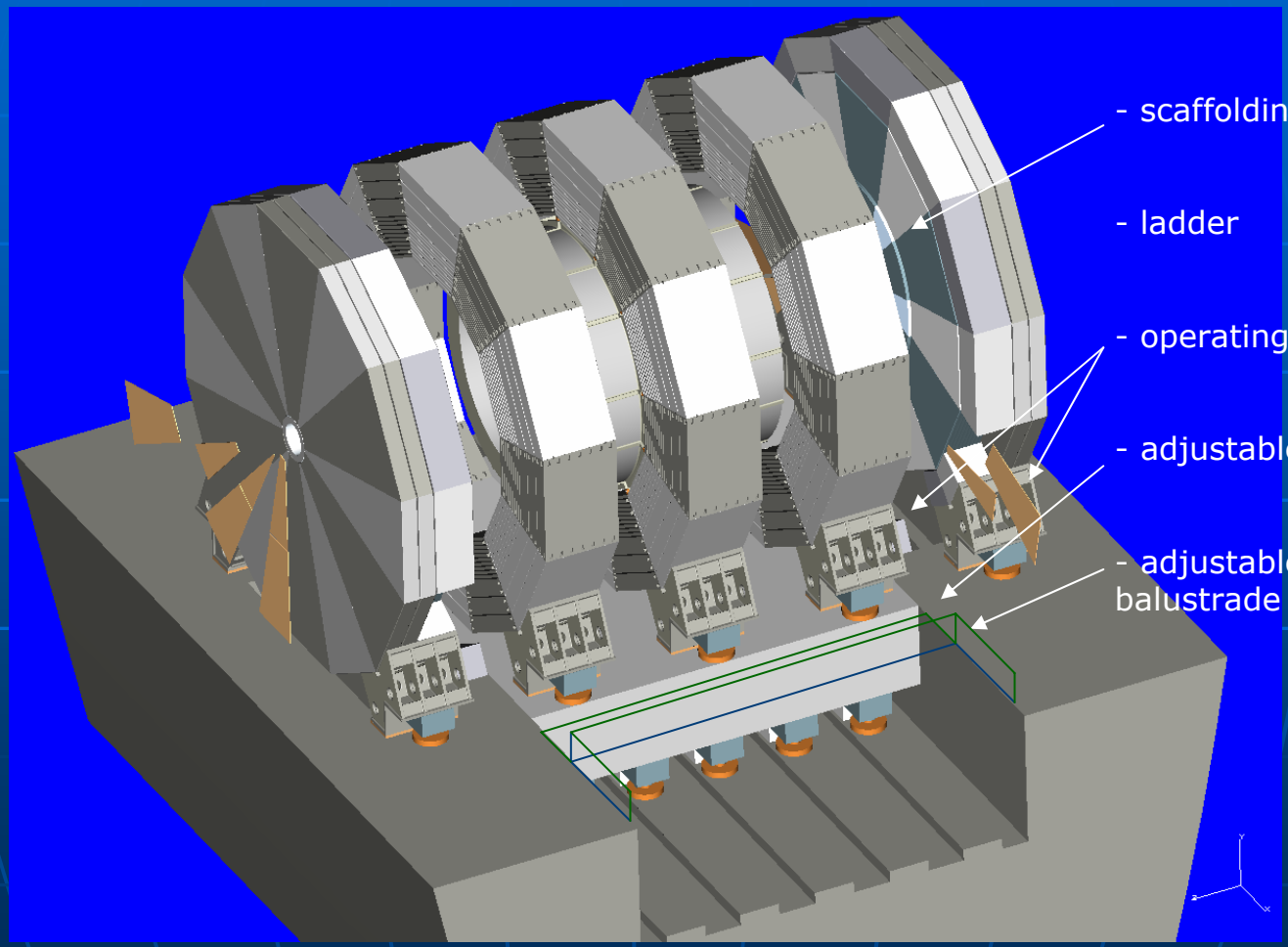




# Alternative shut down position / only end cap moved



# Overview of shut down



# Conclusion

- The detector with end caps and integrated Cryostat make up a contained assembly.
- The platform with detector are assembled as a module with an overall tolerance better than 4 mm, during operation the geometrical changes have to be less than 0.04 mm.
  To achieve these tolerances, available manufacturing methods still have to be evaluated.
- Platform with detector has to be isolated from external influences like radiation protection wall, vibration, underground and earth movements.
- The platform also has to have an additional locking mechanism also interlock system, for safety reasons during operation.
- Sufficient access has to be provided for, scaffolding, cranes, ladders etc. so that tools and equipment may be easily employed during maintenance.
- In case of technical problems, external access to air-pads, sensors, cables and connectors has to be quick and easy.
- Safety issues have to be considered from the outset of the design and enough space has to be reserved for escape routes, fire alarm and fire extinguish devices.