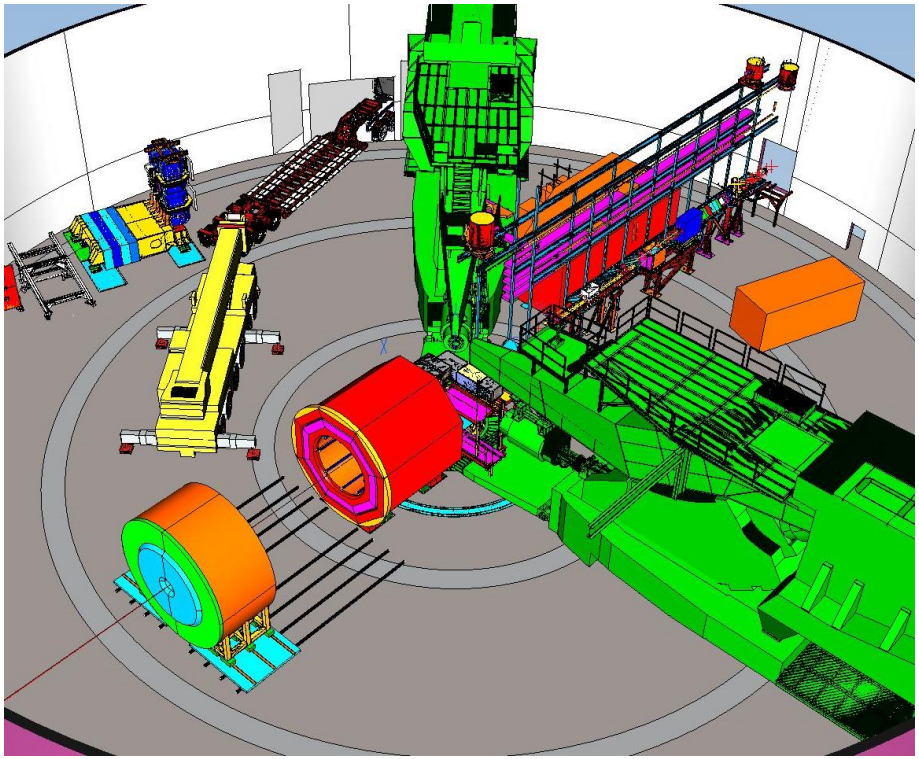
SoLID Collaboration Meeting

Magnet & Detector Support



Whit Seay

February 19, 2026

Presentation Outline

Latest updates:

1) Engineering and design support - CAD model updated
2) Update on engineering and design support for CY26

Magnet – Engineering and Design Support

After consulting with SoLID Collaboration work will focus on the following priorities:

1. Produce SoLID cad model matching latest magnet design from Jay Benesch.
   Continue design and engineering work on magnet components including supports and motion system.

2. Coordinate with the LGC group to update tank design, specifically focused on how the LGC interfaces mechanically with the greater SoLID assembly and accounting for all expected necessary attachments and cabling from the LGC and other components/detectors that require space in the vicinity of the LGC detector.

3. Coordinate with EC group to have a conceptual design to mount EC shower, pre-shower and SPD for both forward and large angles.

4. Coordinate with HGC, baffle, GEM and MRPC groups to have a conceptual design to mount them.

During Summer 2025 a Hall A engineer and designer worked for several weeks item #1

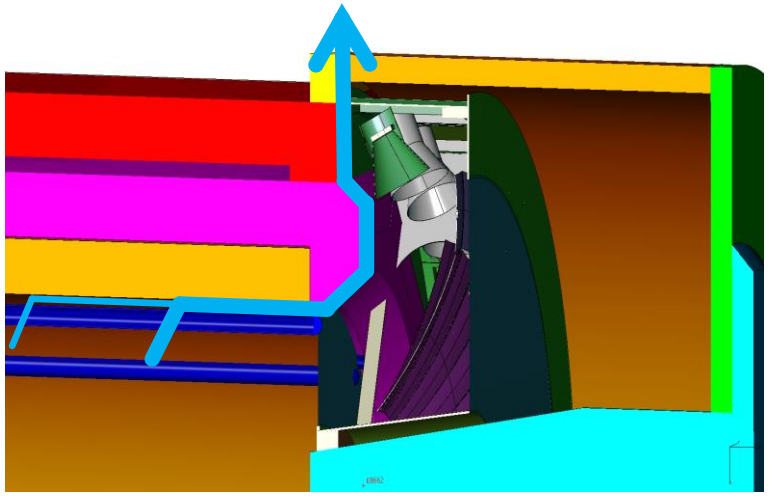
Magnet – Engineering and Design Support

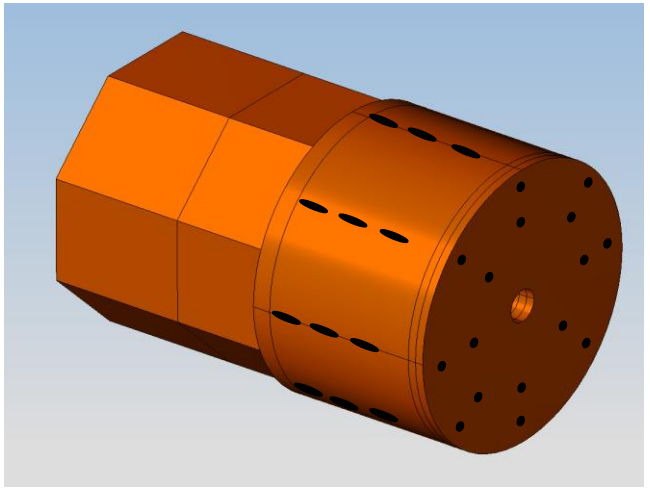
Priority:

1. Produce SoLID cad model matching latest magnet design from Jay Benesch.

- ✓ Match geometry of magnet steel
- ✓ Add details of axial and radial support mechanisms
- ✓ Add some of the required details to assemble magnet. Mounting hardware, etc
- ✓ Add detail of personnel access for the magnet
- ✓ Develop magnet and endcap support system (Magnet support progressing)
- • Develop and engineer mechanical interface of magnet components for assembly
- • Further the design concept for detector support rails inside magnet and endcap
- • Develop details for cable routing – access holes in steel, etc

Design work listed above will help prepare for priorities 2 thru 4.





Magnet – Engineering and Design Support

The design effort on priority #1, to date, produced the following:

1. Cleaned up the existing NX CAD model. A lot of “mock-up” out of date geometries removed. This brought the structure of the CAD model more in line with our group’s standards.

2. Created detailed model of the existing return steel with all cutouts and threaded holes.

3. Created the cuts to match the latest return steel geometry. Add conceptual mounting holes for new return steel (endcap) interface to look for interferences with existing holes.

4. Add cryogenic platform on top of magnet

5. Updated endcap cone geometry of production model to match Jay’s TOSCA (Spring 24)

6. Created personnel access to the top of the magnet to establish detector loading zone for the upstream endcap region (Summer/Fall 25)

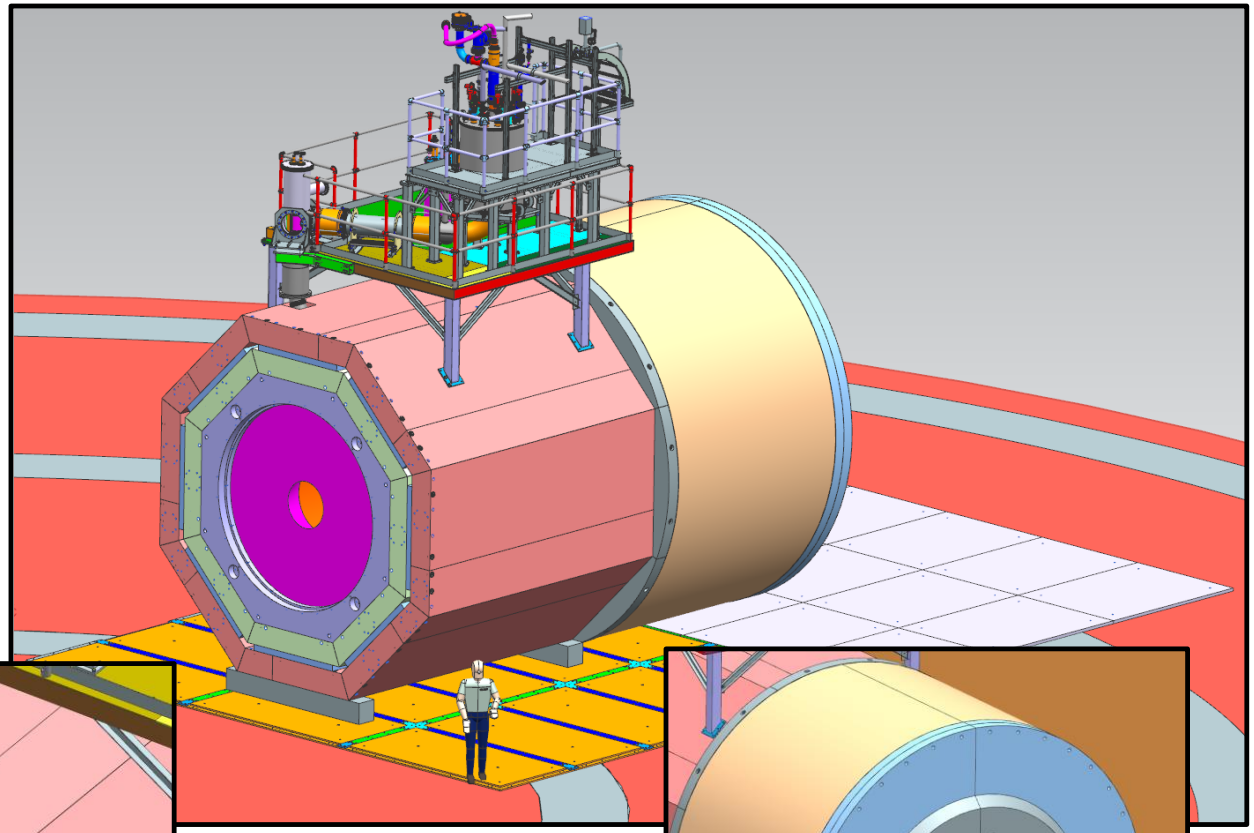
7. Developed the vertical alignment/support for the main magnet (Summer 25)

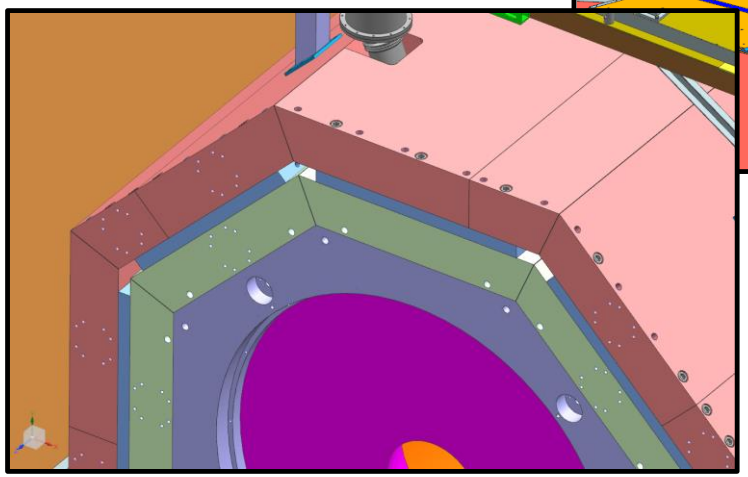
Magnet – Engineering and Design Support

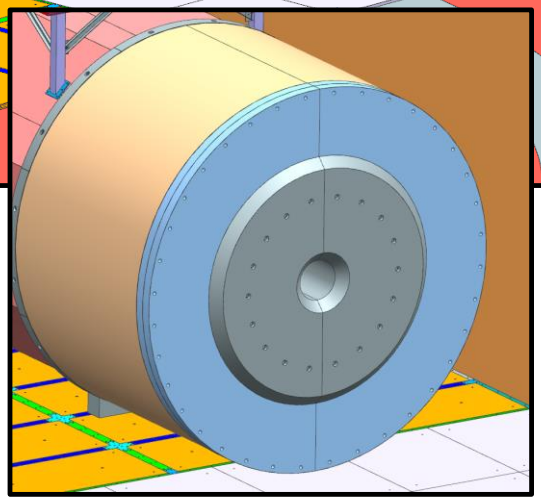
All known existing holes in the steel have been modeled.

Mounting hole concept established on the endcap.

Added service turret and CCR components along with access platform on top of the magnet.

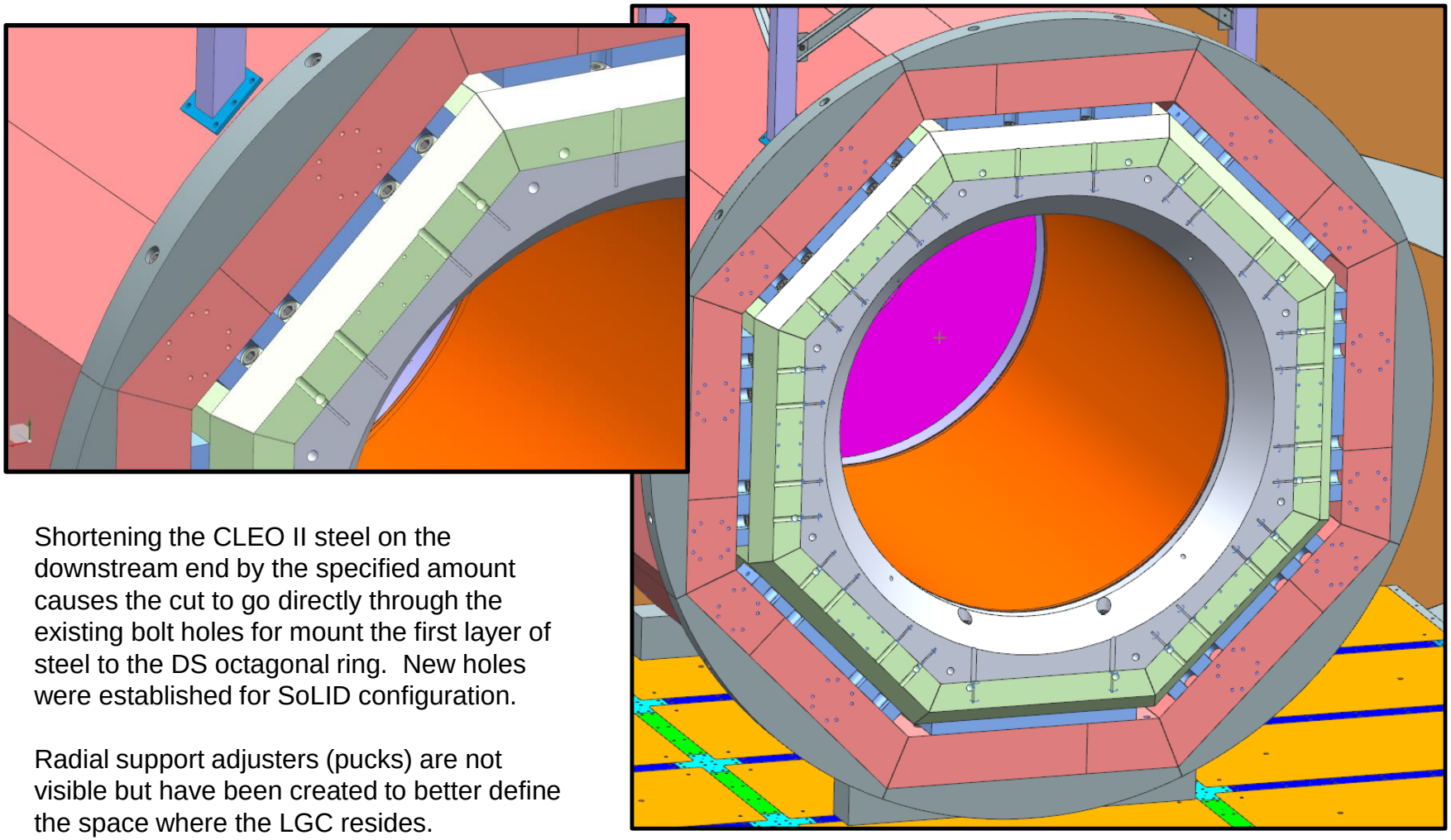






Magnet – Engineering and Design Support

Downstream end of the magnet – endcap removed

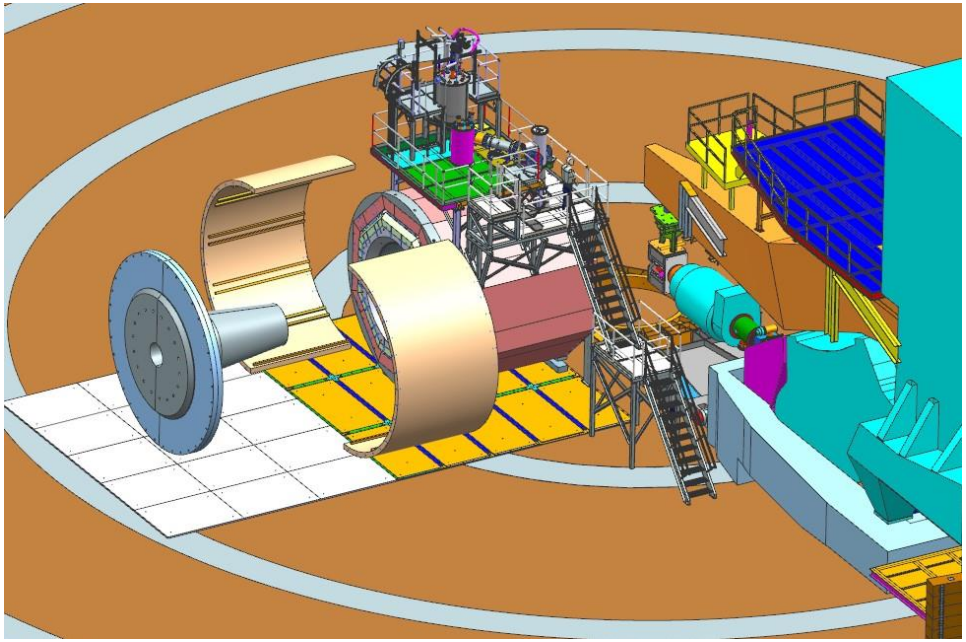


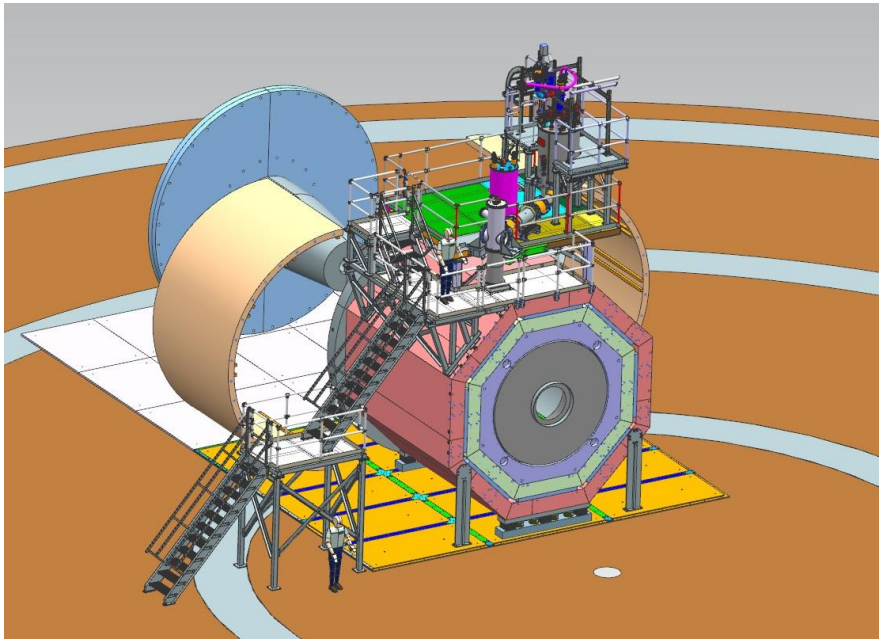
Shortening the CLEO II steel on the downstream end by the specified amount causes the cut to go directly through the existing bolt holes for mount the first layer of steel to the DS octagonal ring. New holes were established for SoLID configuration.

Radial support adjusters (pucks) are not visible but have been created to better define the space where the LGC resides.

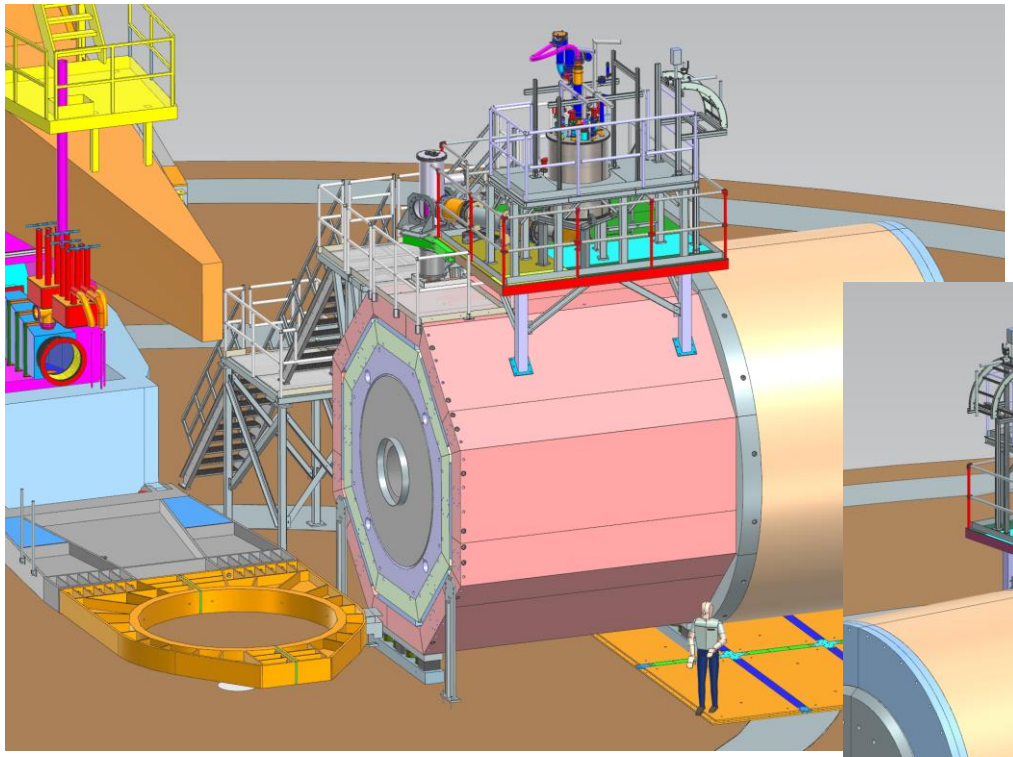
Magnet – Personnel Access

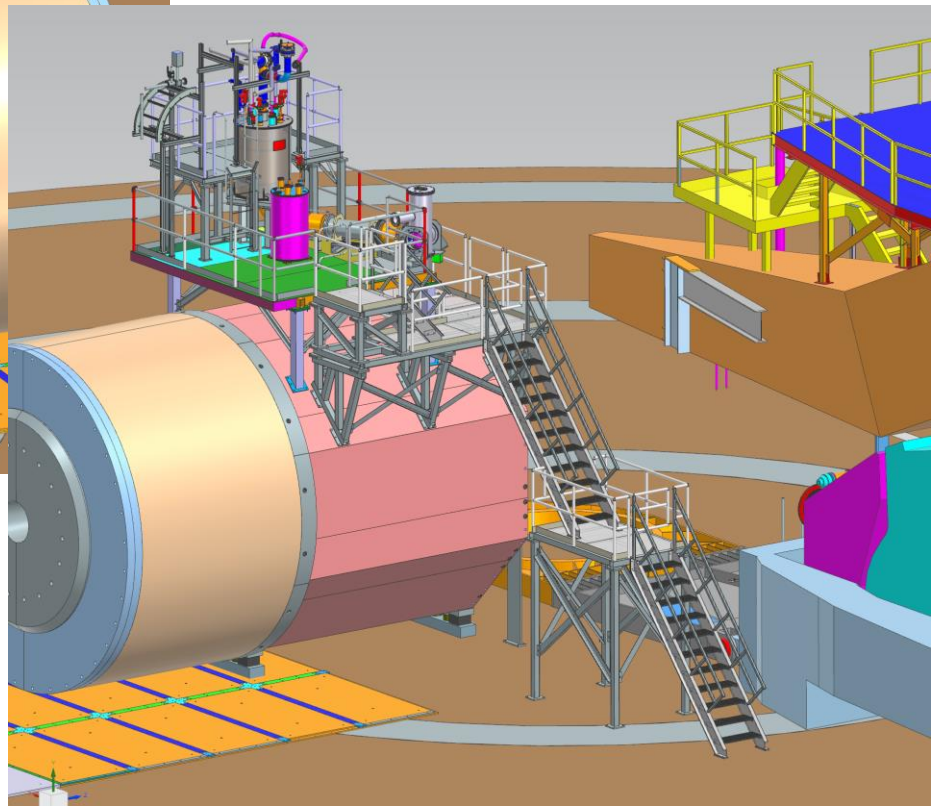
- Establish access to the top of the magnet and the neck and turret area
- Determined the layout to avoid existing hall structure
- Aim is to maximize the area upstream of the endcap cylinder for the installation of detectors
- Re-uses the aluminum platform from the test lab cold test





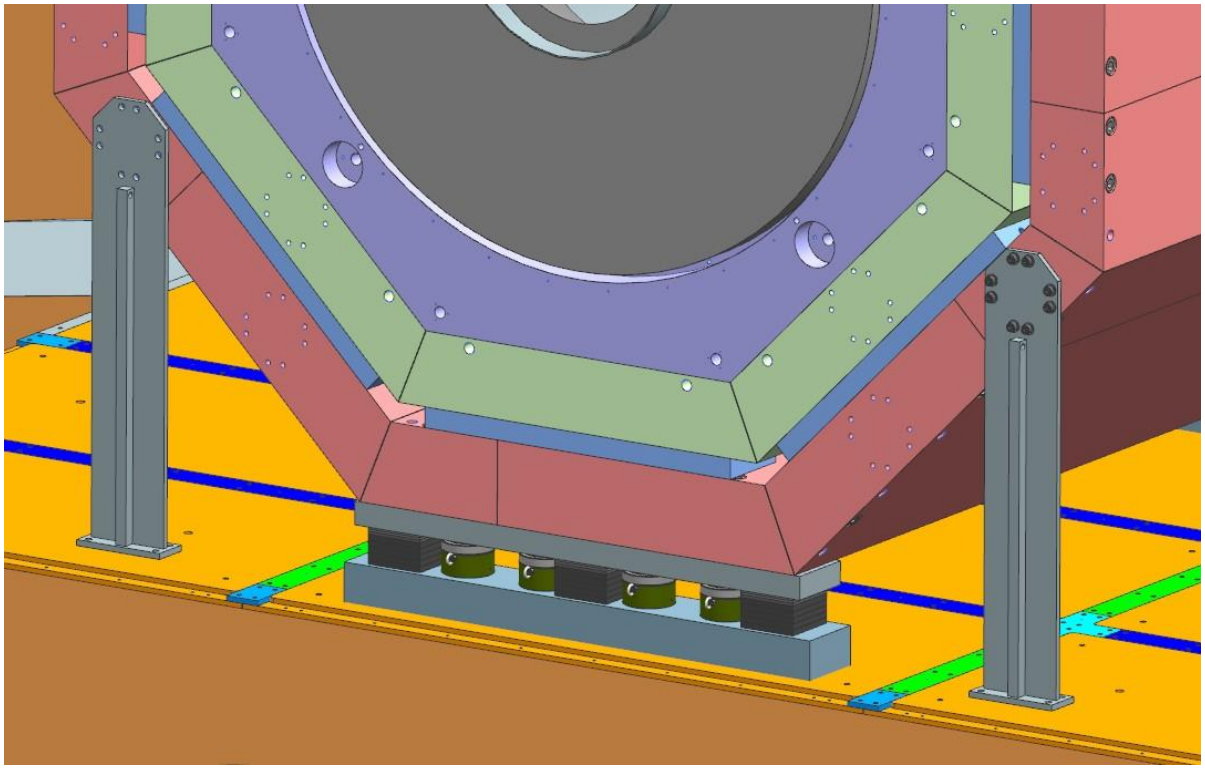
Magnet – Personnel Access





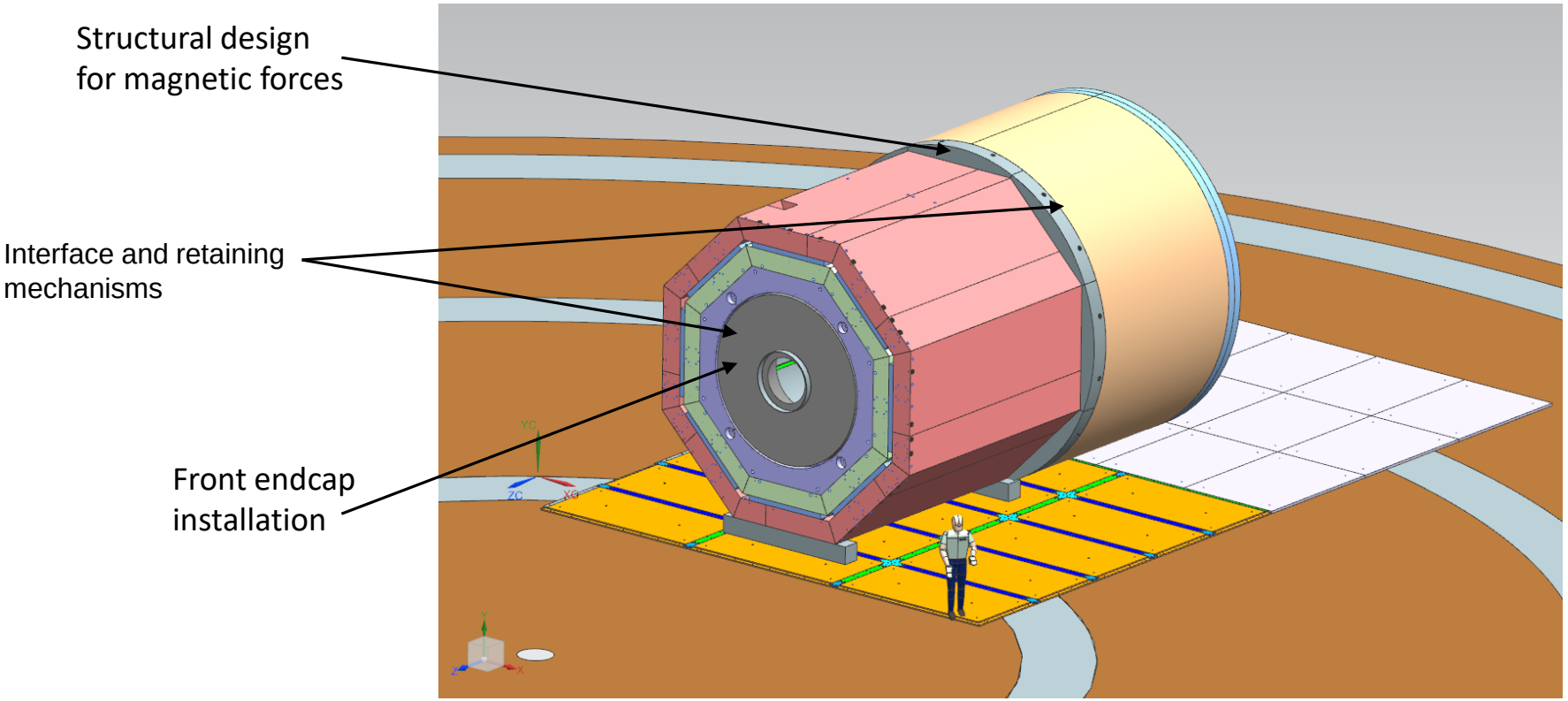
Magnet – Vertical Alignment and Support

- Develop structural support and alignment system for main magnet steel.
- Provides adjustment in the vertical and pitch DOF to bring magnet center onto beam centerline.
- Outriggers provide additional stability.



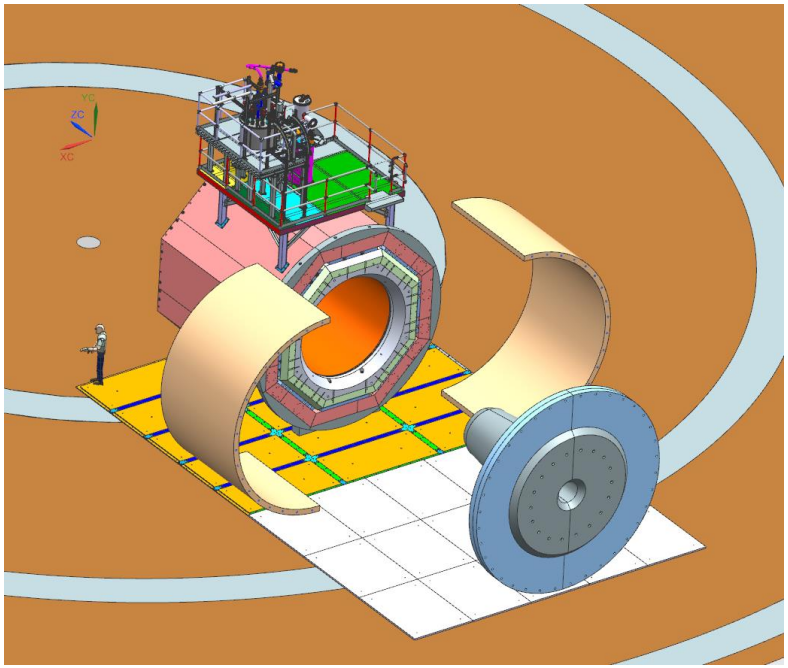
Magnet – Detector Support Structure

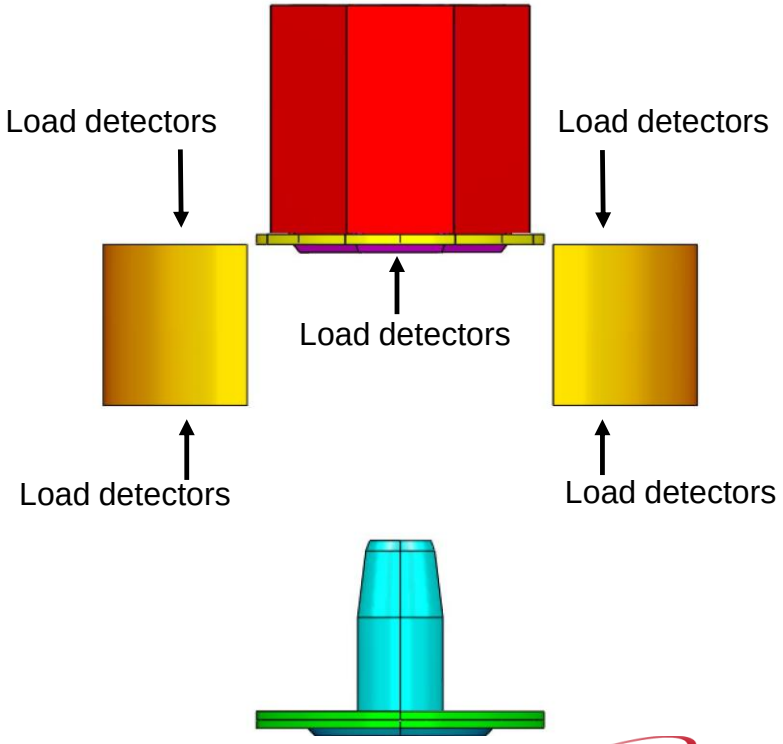
- Design magnet interface components for installation and magnetic forces.
- Finalize design of support base for magnet and endcap. Ensure weight distribution under main magnet.
- Develop installation concept for front endcap and retaining mechanisms.
- Develop system for repeatably position the endcap when retracted to the magnet. Design retaining mechanisms.



Magnet – Endcap Motion Concept

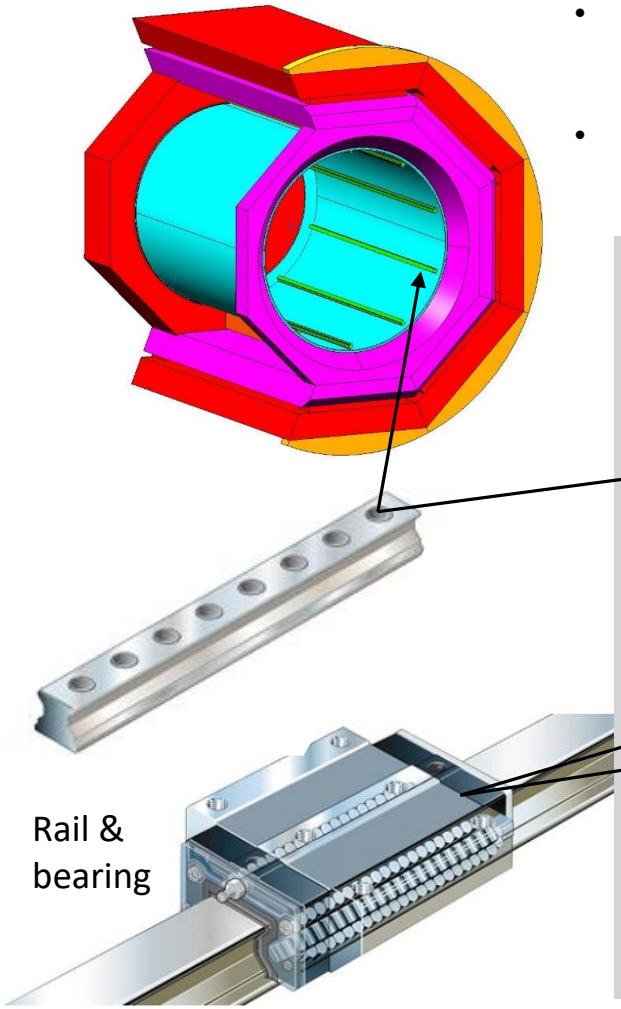
- Develop structural support and motion system for cylinders and backplates.
- Decouples the nose and backplates from the half cylinders
- Provides additional access points for installing and servicing detectors
- Simplifies motion system and tracks mounted to the floor

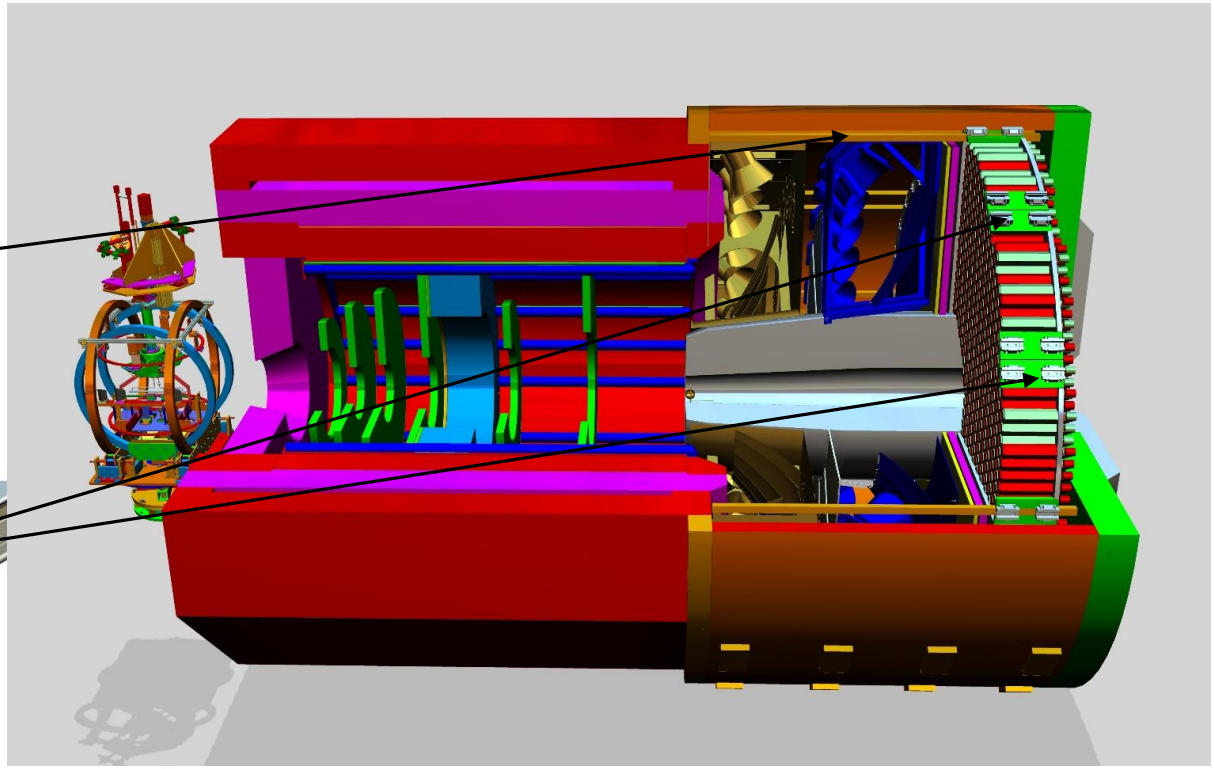




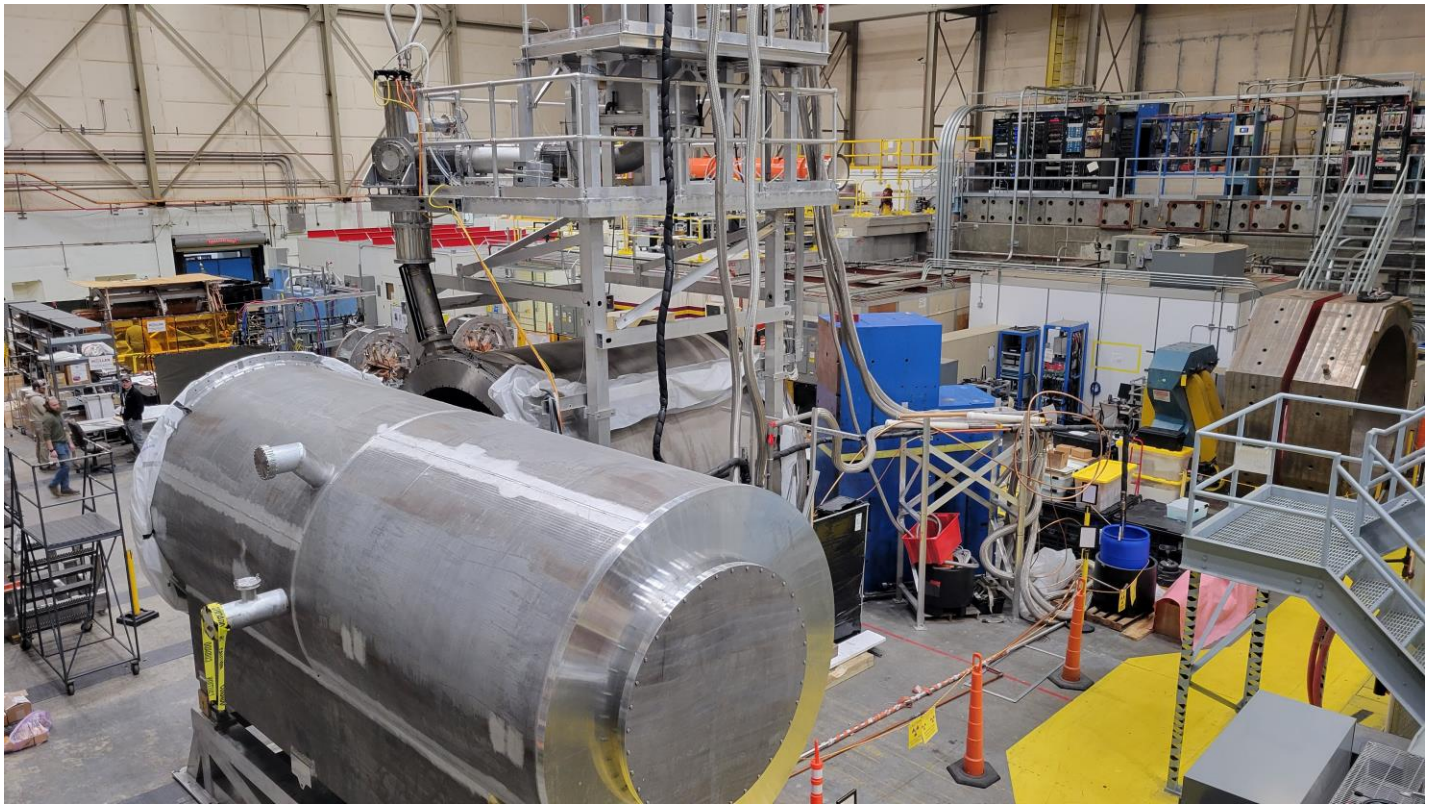
Magnet – Detector Support Structure

- Provide a universal mounting system that is utilized by each detector group for internal magnet and endcap locations.
- Conceptual design uses off the shelf rails and bearings. Bearings will be integrated into individual detector design.
- Engineering analysis on-going to specify components for detector mounting. Analysis includes deflection and structural calculations.





Magnet – Engineering and Design Support



- The SoLID footprint was completely condensed to accommodate MOLLER equipment.
- As MOLLER components head to the hall for installation, the SoLID area will open back up towards the end of the year.
- Scaffolding can be reinstalled for access up top and He and N2 circuit pressure testing and work on identifying and repairing the vacuum would be priority if labor is available

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Questions/Comments?