Istituto Nazionale di Fisica Nucleare
SEZIONE DI FERRARA

KLOE to SAND

Magnet Coil: dismantling and transport (WP5)

Meeting annuale DUNE

A.Saputi – F.Evangelisti

Focus of the presentation

- Services and equipment required for the magnet removal, transport, and reinstallation
- Current status of the design
- Preliminary procedure to be followed
- People involved in the operations
- Estimated time needed for the activities

Cryostat and Magnet Coil: dimensions and weight

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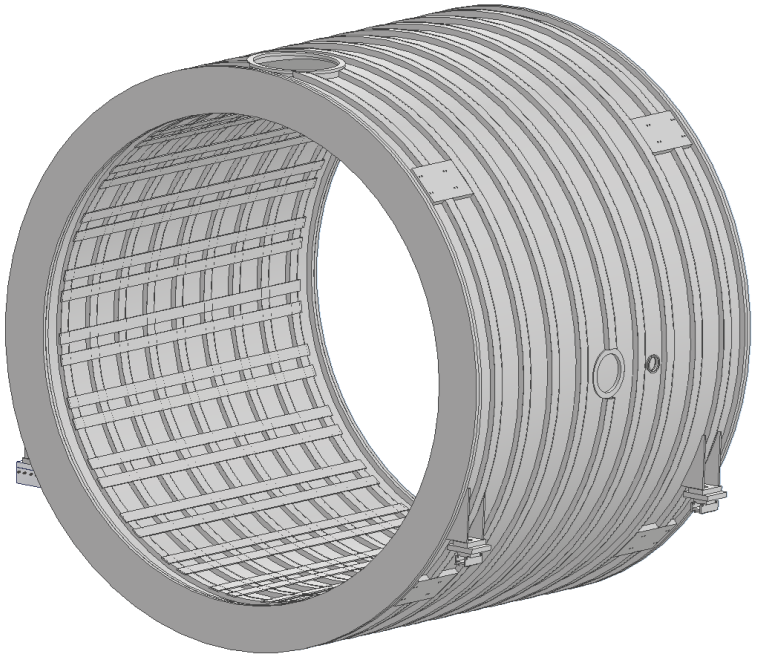
(Cryostat + Coil) dimensions: Φ = 5766 mm ; L= 4400 mm

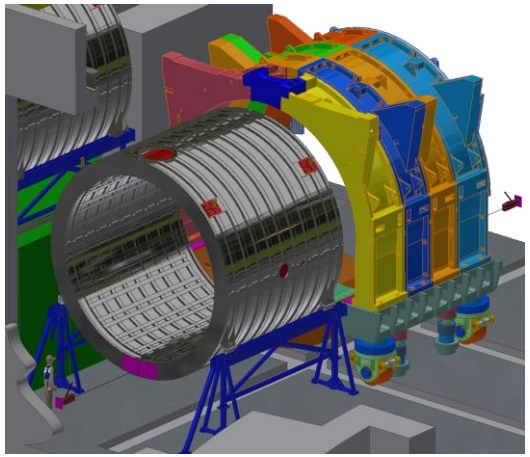


Cryostat + Coil ≈ 40 tons

20 x

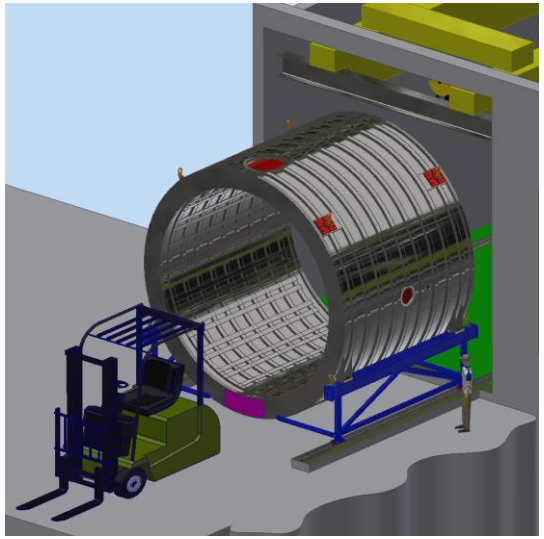
Services, structures and tools: extraction (@LNF) & insertion (@FNAL)

Crane = 22 t + 22 t

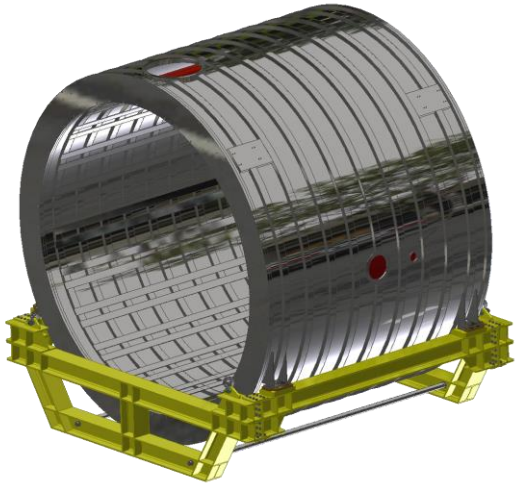


Extraction/Insertion Tool

Loading Dock



Trolley System



Cradle

Lugs

Services and tools: loading and unloading operations

Two cranes

Lifting Beam

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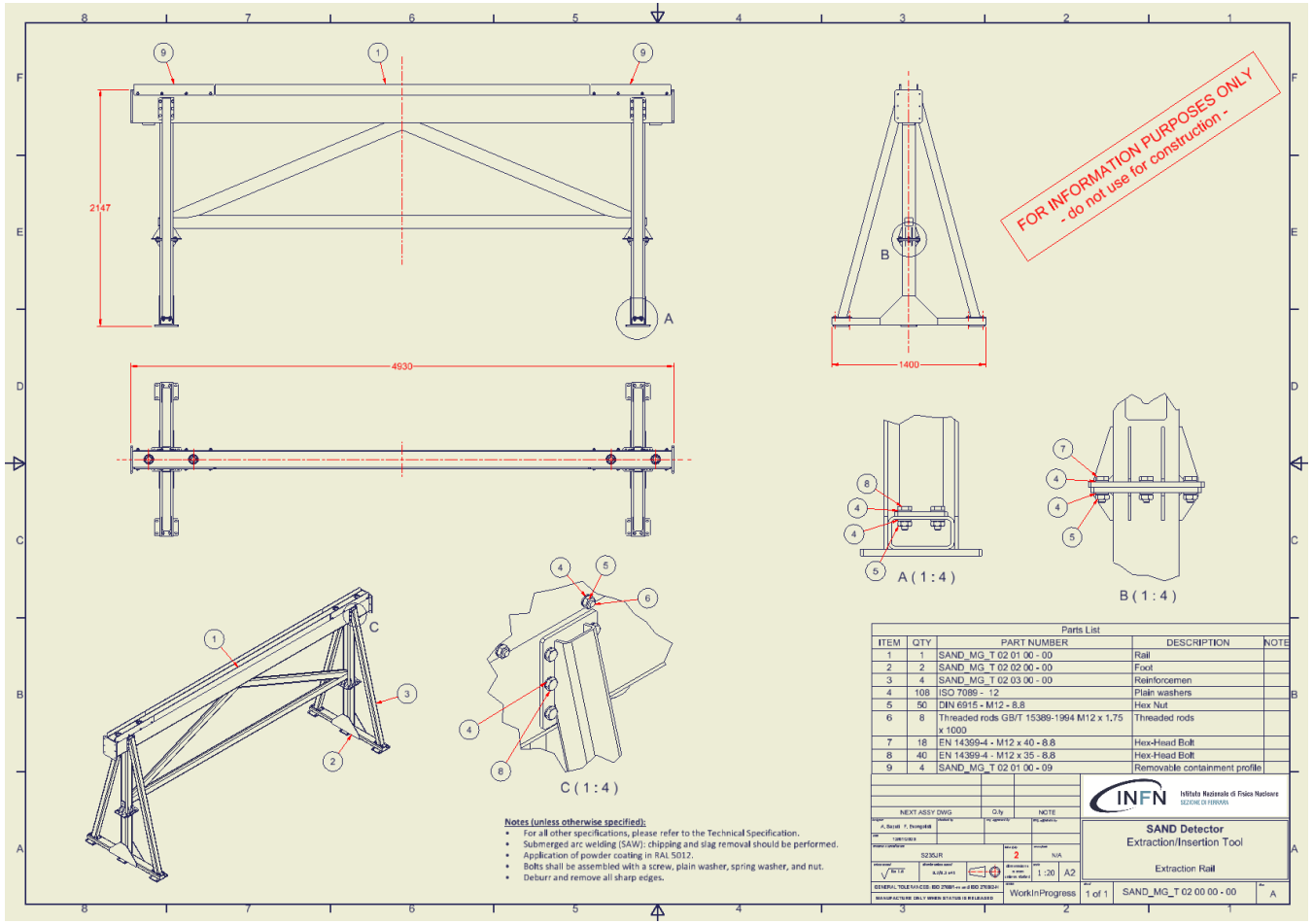
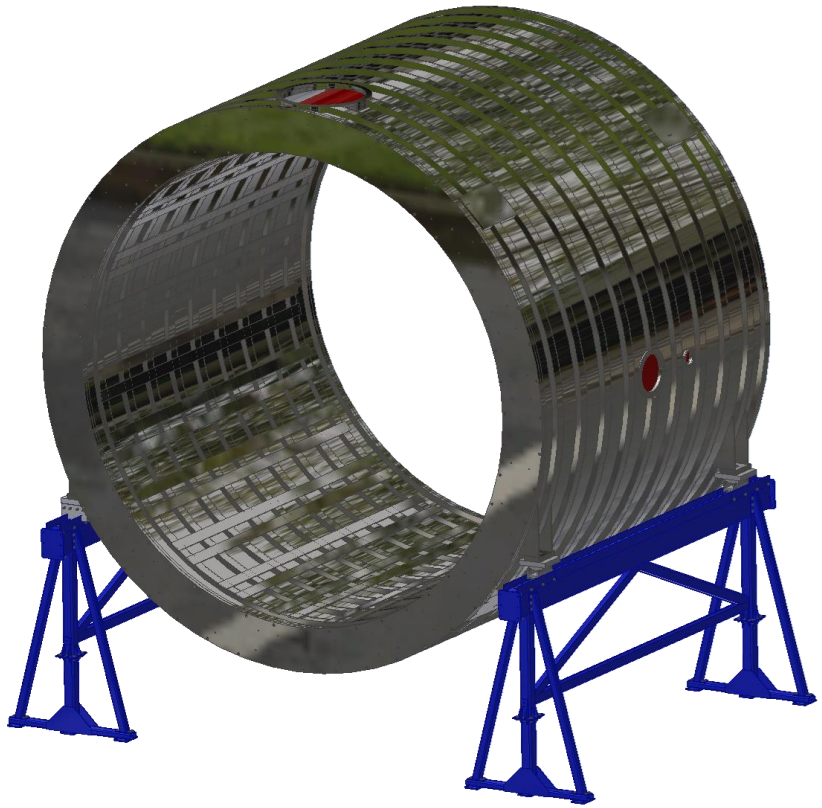
Design Status: where we stand today

Design Status: extraction/insertion tool

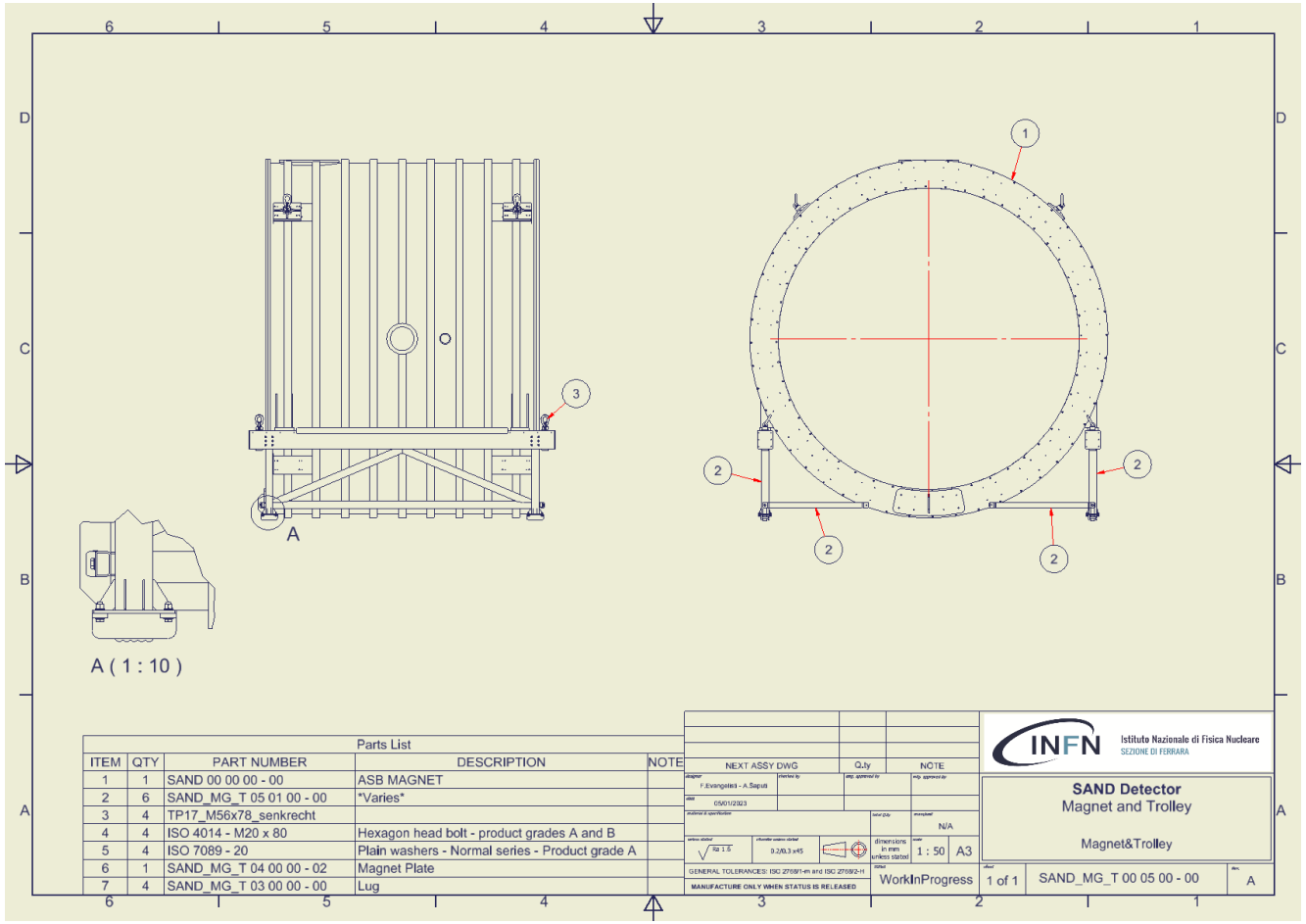


Extraction/Insertion system: consisting of two metal structures that will be anchored to the floor.
This system will allow the magnet to slide smoothly out of the yoke.



- All workshop drawings are ready
- Technical specification is ready

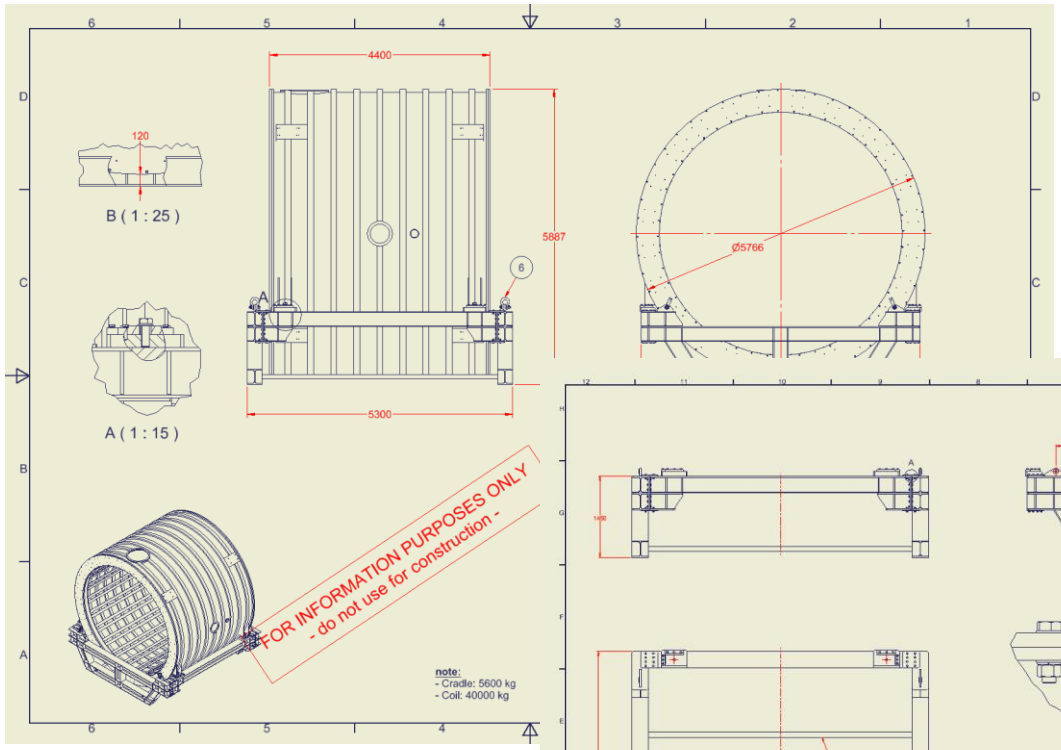
Design Status: trolley system

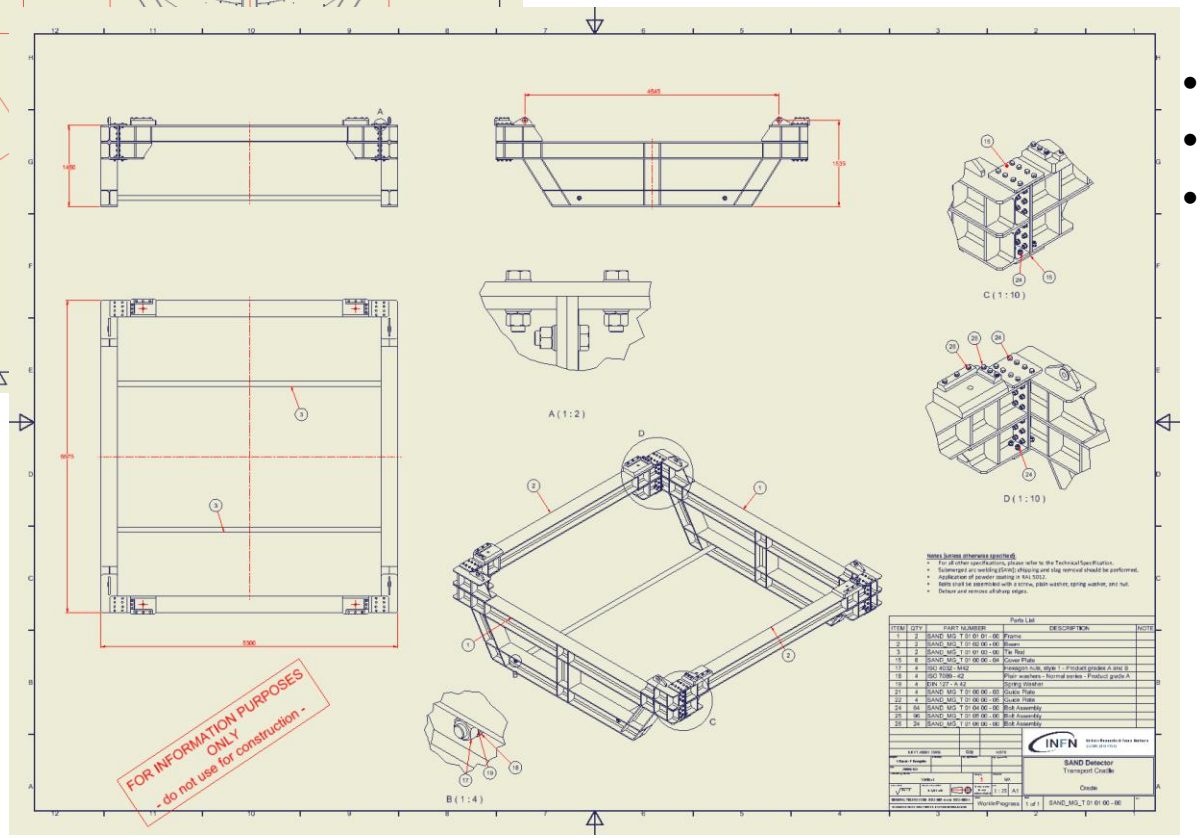


- All workshop drawings are ready
- Technical specification is ready

Part of the extraction system will be reused to assembly the tool needed to move the magnet from the assembly hall to the outside.

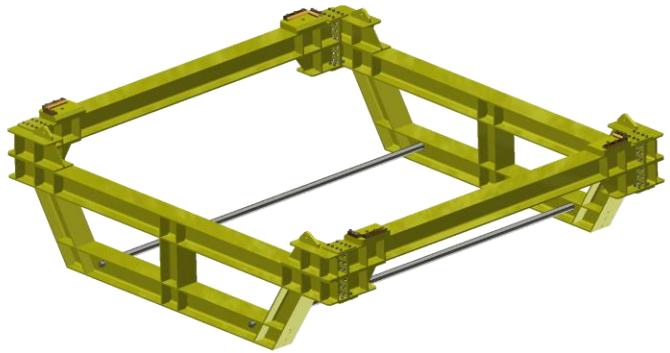
Design Status: transport cradle



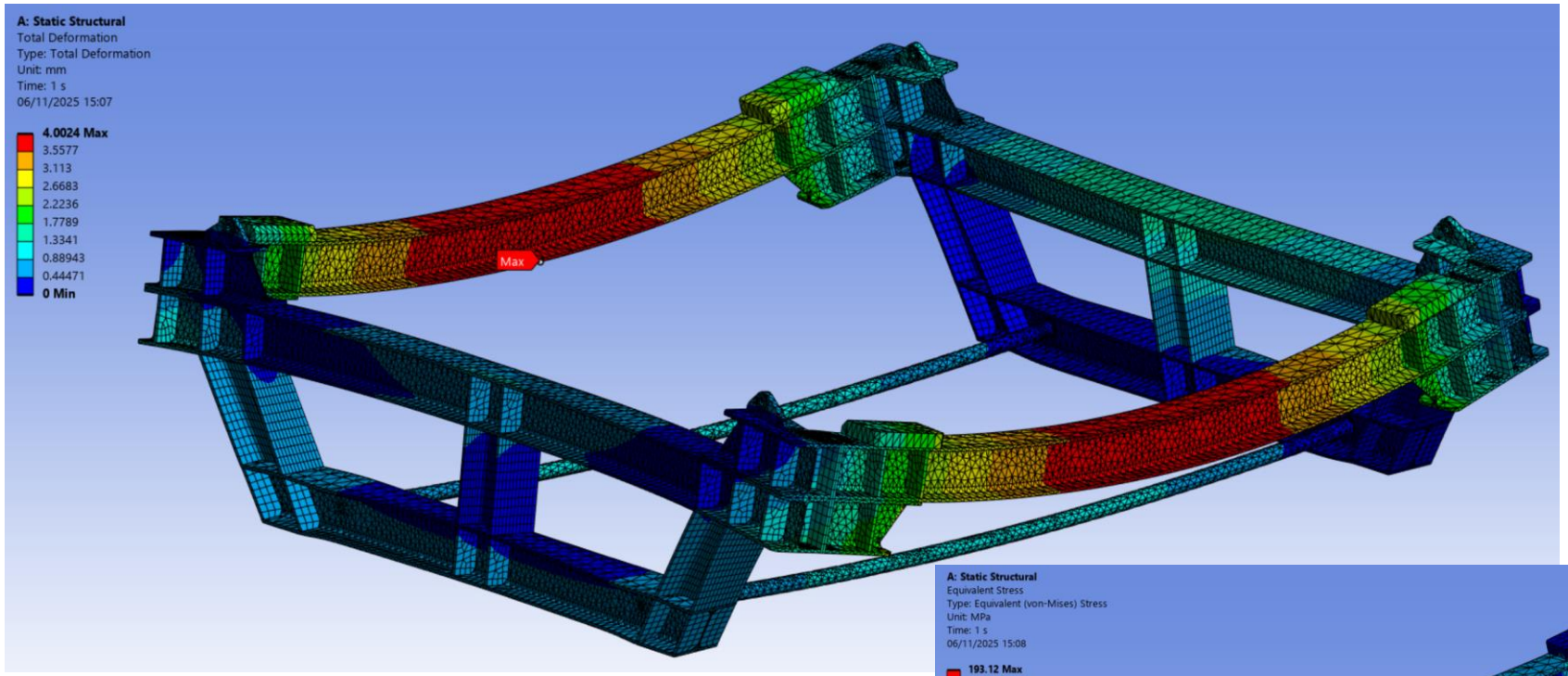


The transport cradle is a fully bolted steel structure, designed to minimize transportation costs from the factory to LNF.
It will be used to transport the magnet from Italy to the United States.

- All workshop drawings are ready
- Technical specification is ready
- Cost estimation: asked



Design Status: calculation for certification



Lifting systems must be comply with:

- ASME B30-20
- ASME BTH-1
- 29 CFR 1910 and 1926
- FESHM 10110
- FESHM 10200

Documentation:

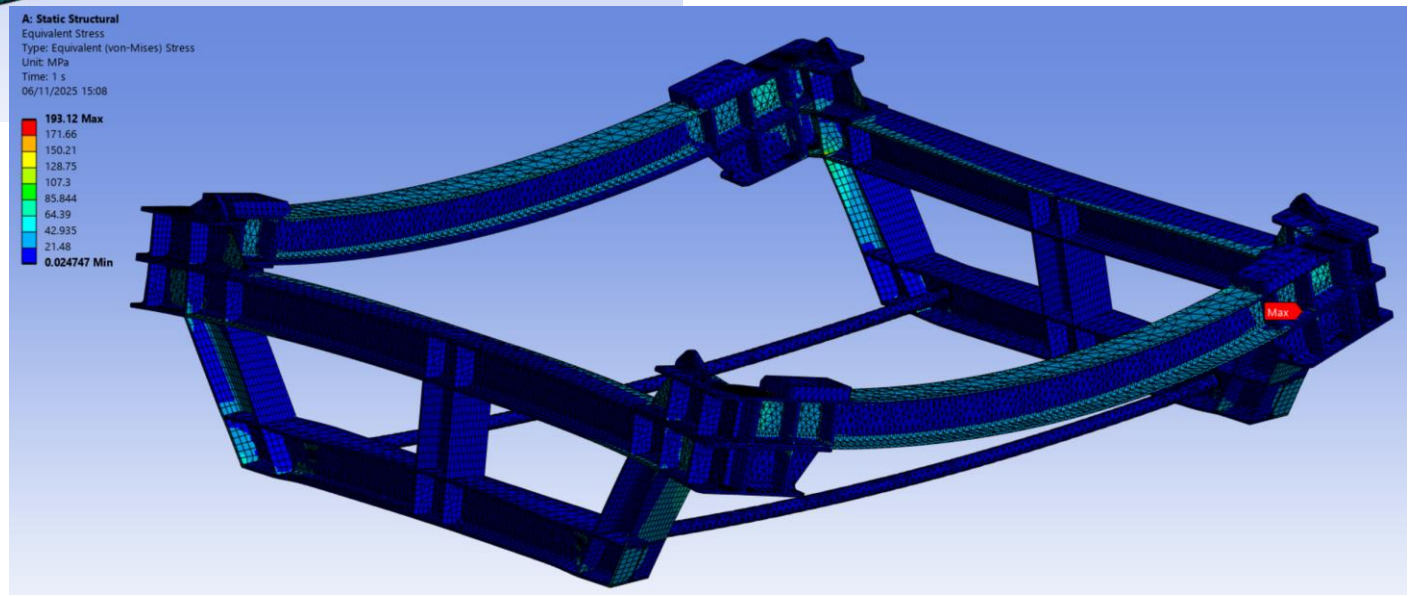
- Calculation and verification (through load test)
- Technical file (engineering report, usage and safety instructions)
- Certification (DOE)

Lifting systems must be comply with:

- EN 13155
- Machinery Directive (2006/42/EC)

Documentation:

- Calculation and verification (through load test)
- Technical file (engineering report, usage and safety instructions)
- Certification (CE)



Design Status

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Tool	3D Model	Workshop Drawings	Sizing and verification calculations	Certification (CE and ASME)	Technical Specification for tender
Extraction and Insertion	Done	Done	Done	To be done	Done
Trolley System	Done	Done	Done	To be done	Done
Cradle	Done	Done	Done	To be done	Done
Lugs	Done	Done	Done	To be done	Done
Tirfort System	Done	Done	Done	To be done	Done

Other project documents	
Work Practices Plan (operating procedure)	Under review
Safety Plan	Under preparation

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Working Procedure

Indoor and outdoor working area

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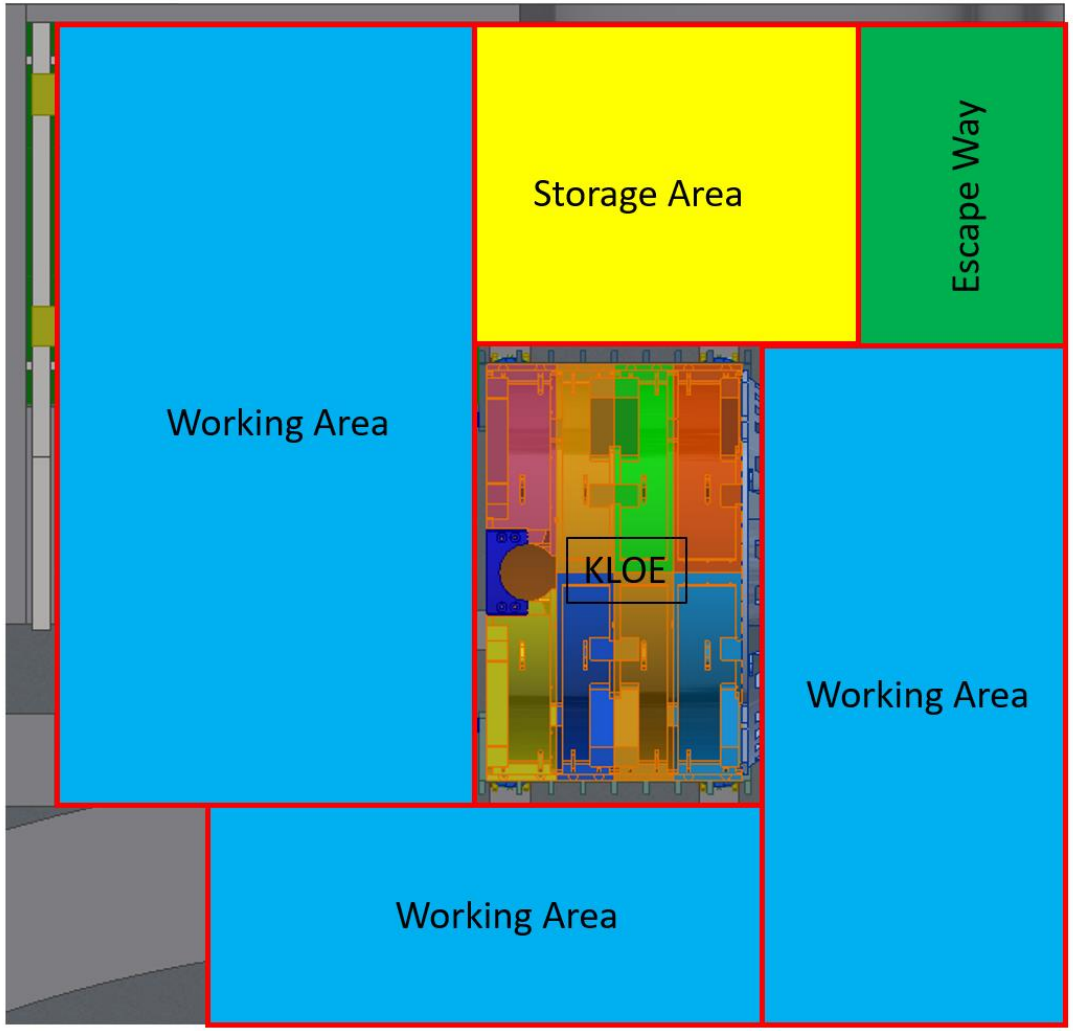
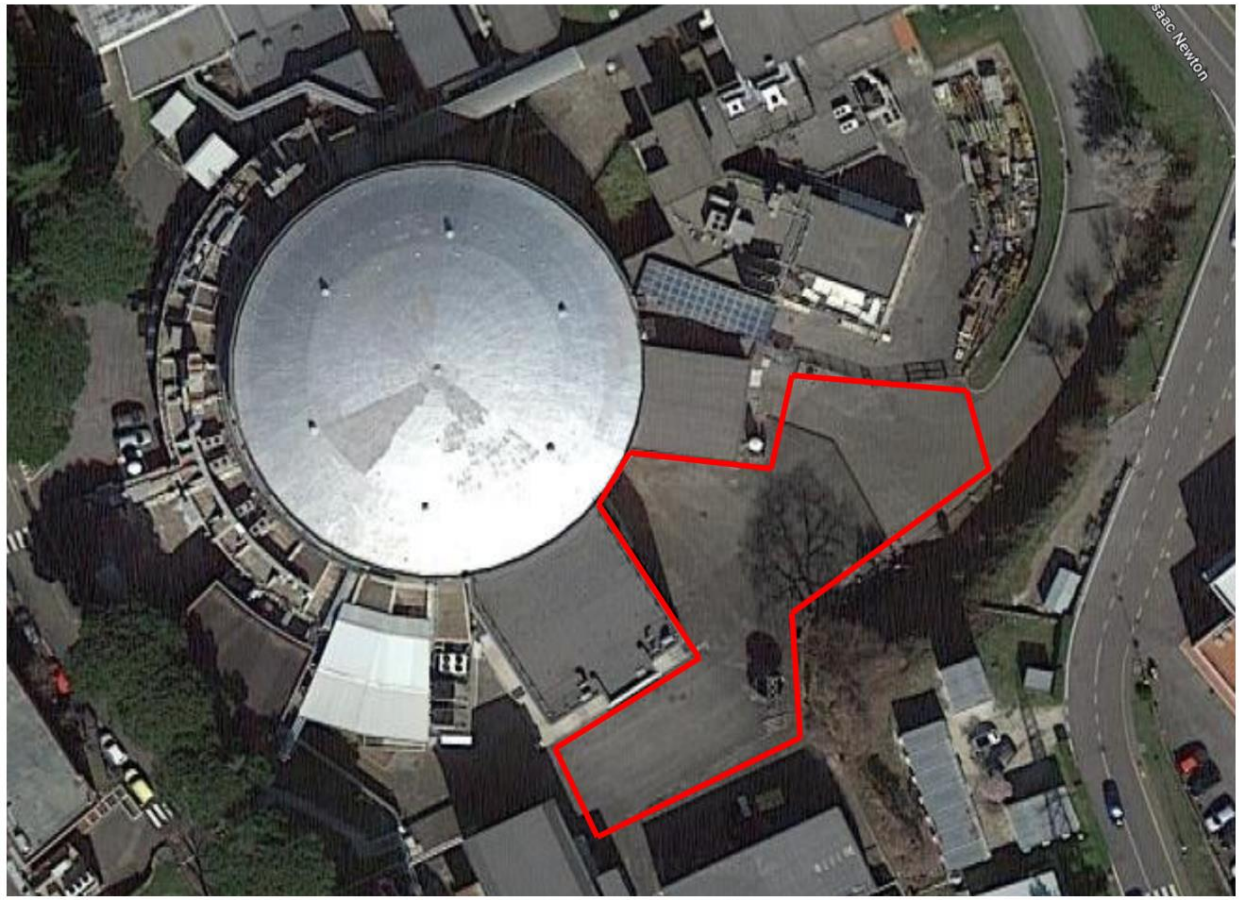
The operations will take place in two main areas:

- The KLOE Assembly Hall
- The outdoor parking area adjacent to it

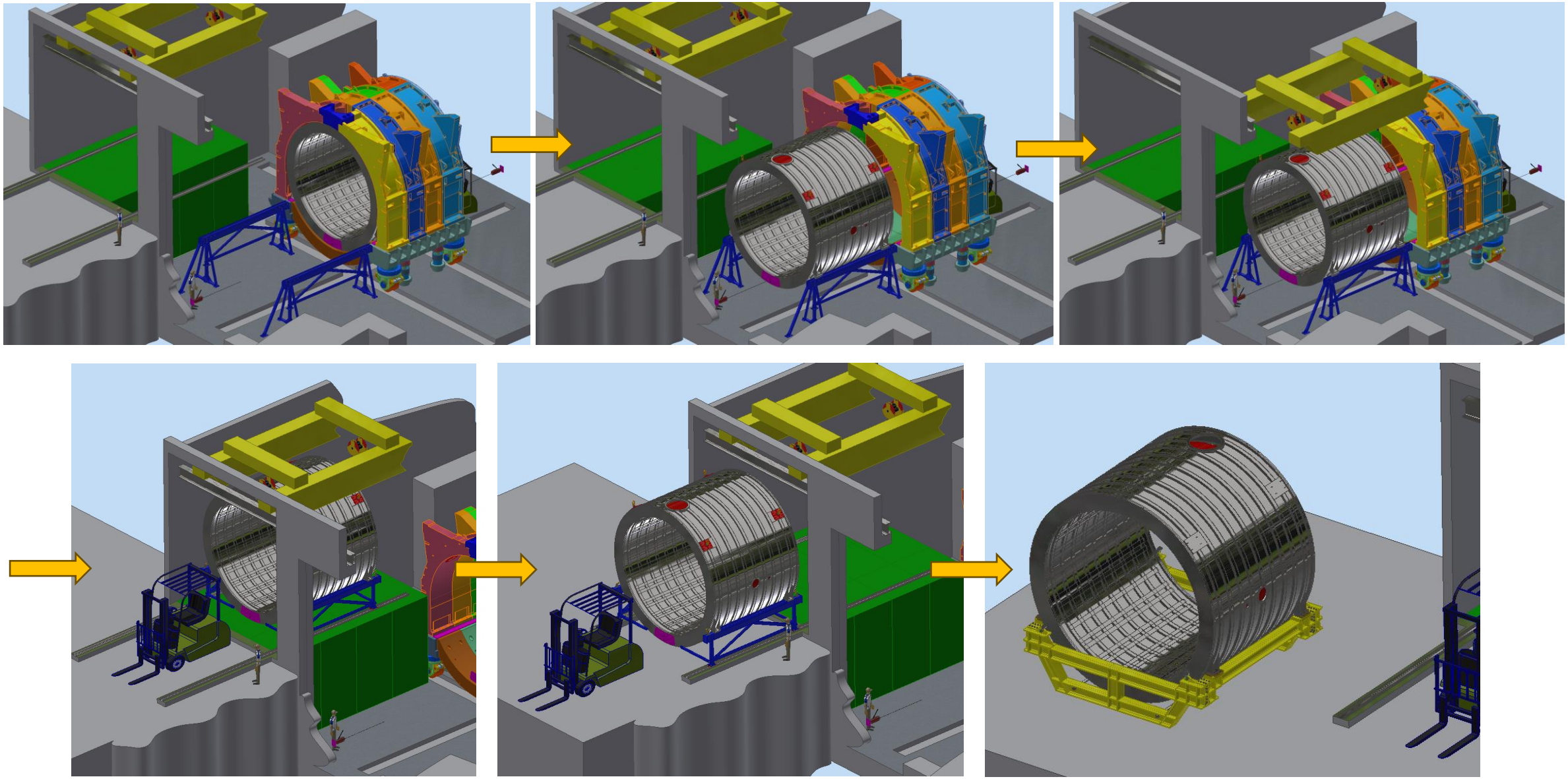


KLOE Assembly Hall



Outdoor Working Area

Magnet extraction: working procedure



Magnet: preparation for transport

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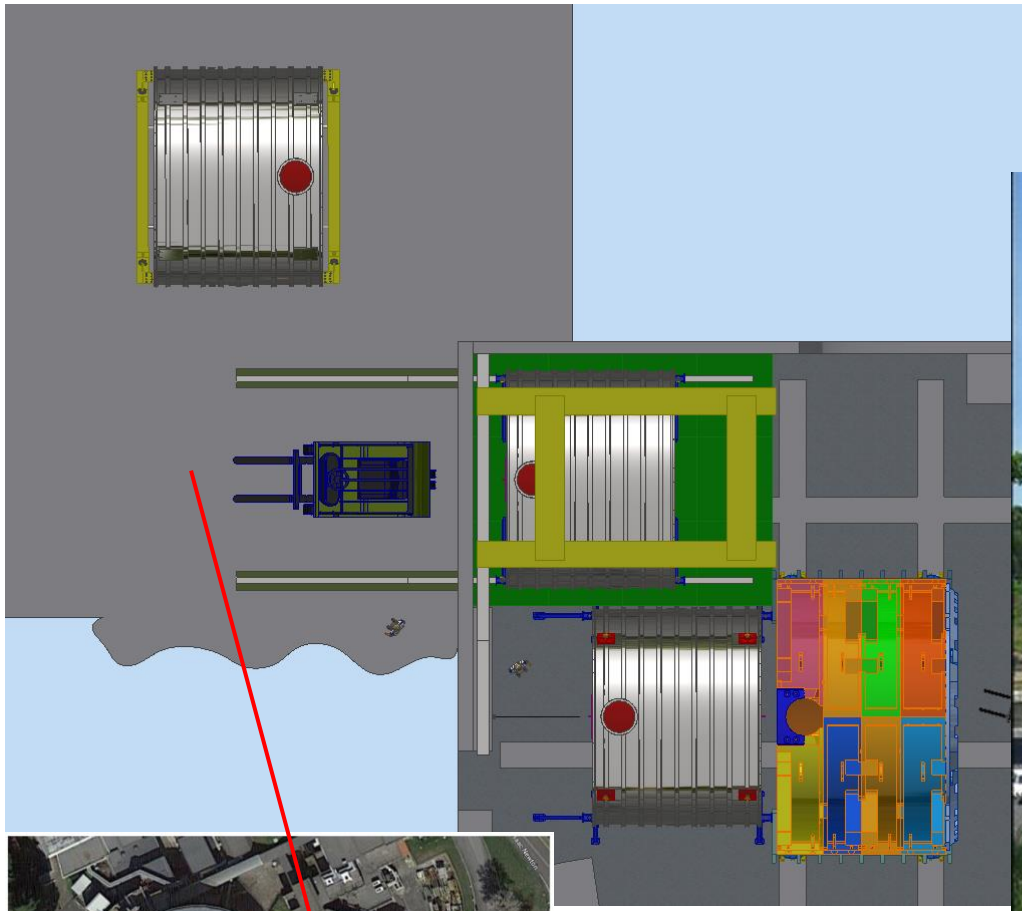
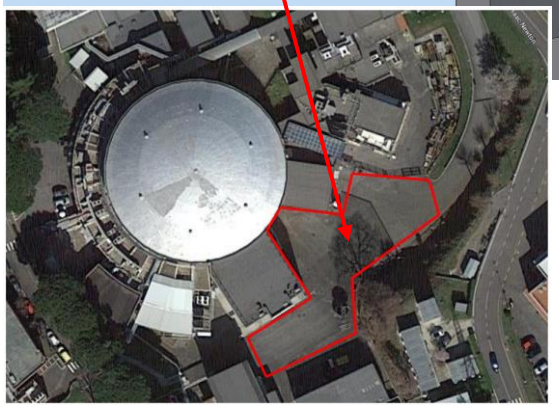
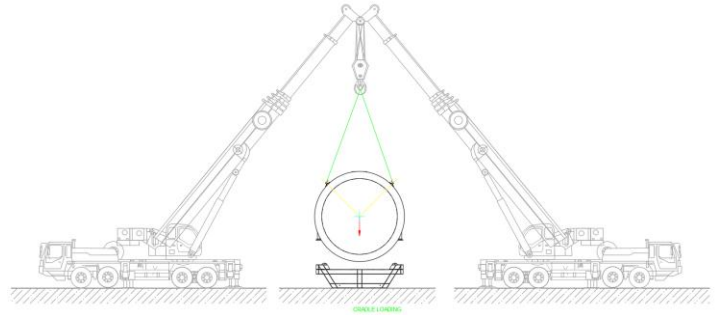
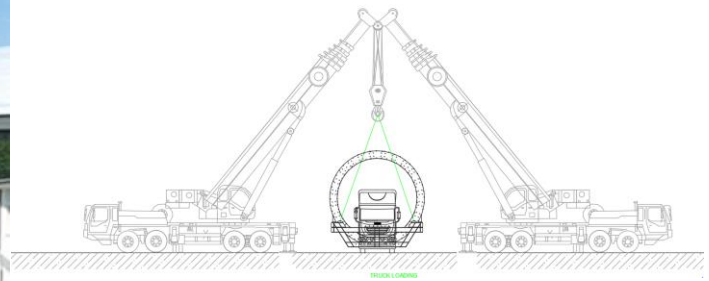






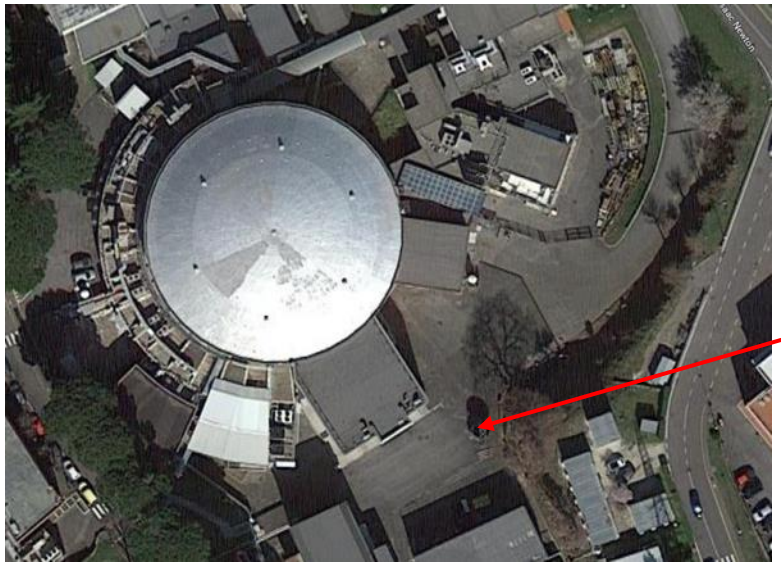
Handling

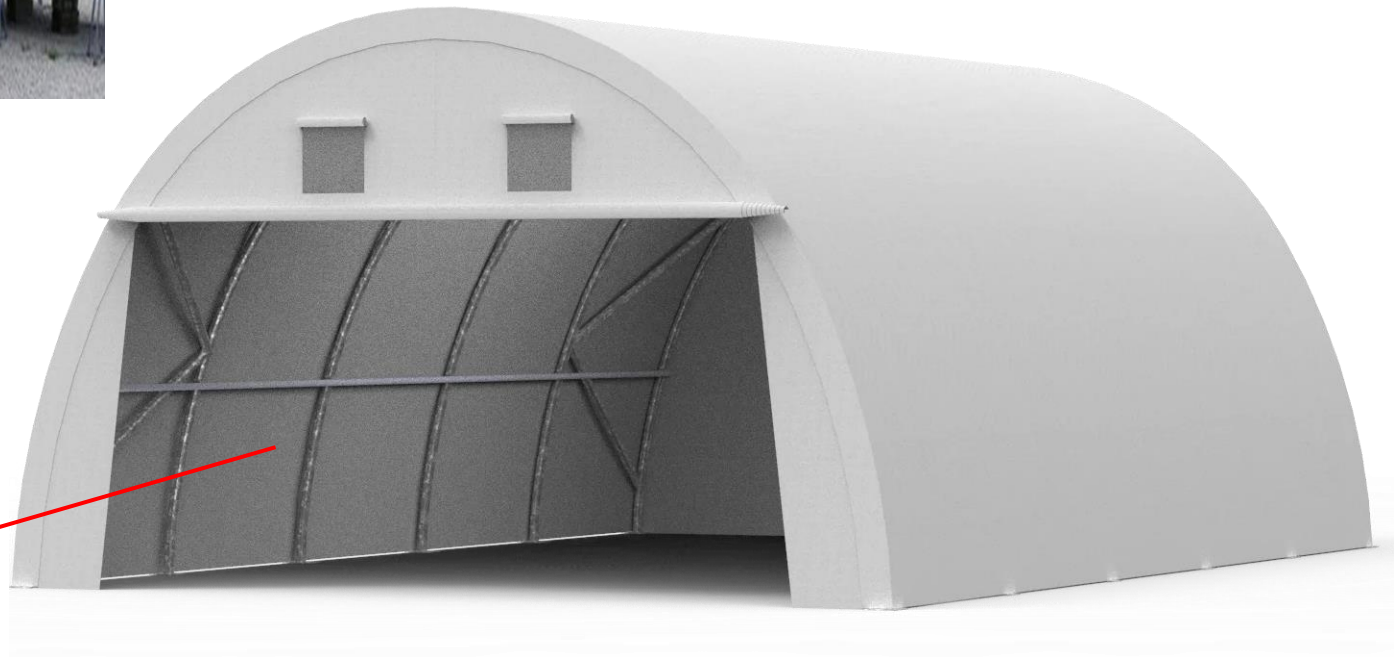


Magnet: temporary storage @ LNF

Protection Wrapping

The magnet will be wrapped to protect it during transport from LNF to FNAL.
It will then be stored at LNF for a few months inside a temporary storage tent.





Temporary Storage Tent

Magnet: transport from LNF to FNAL

On the way to LNF

Loading phase

On the boat

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Preparatory work

Service Turret: removal

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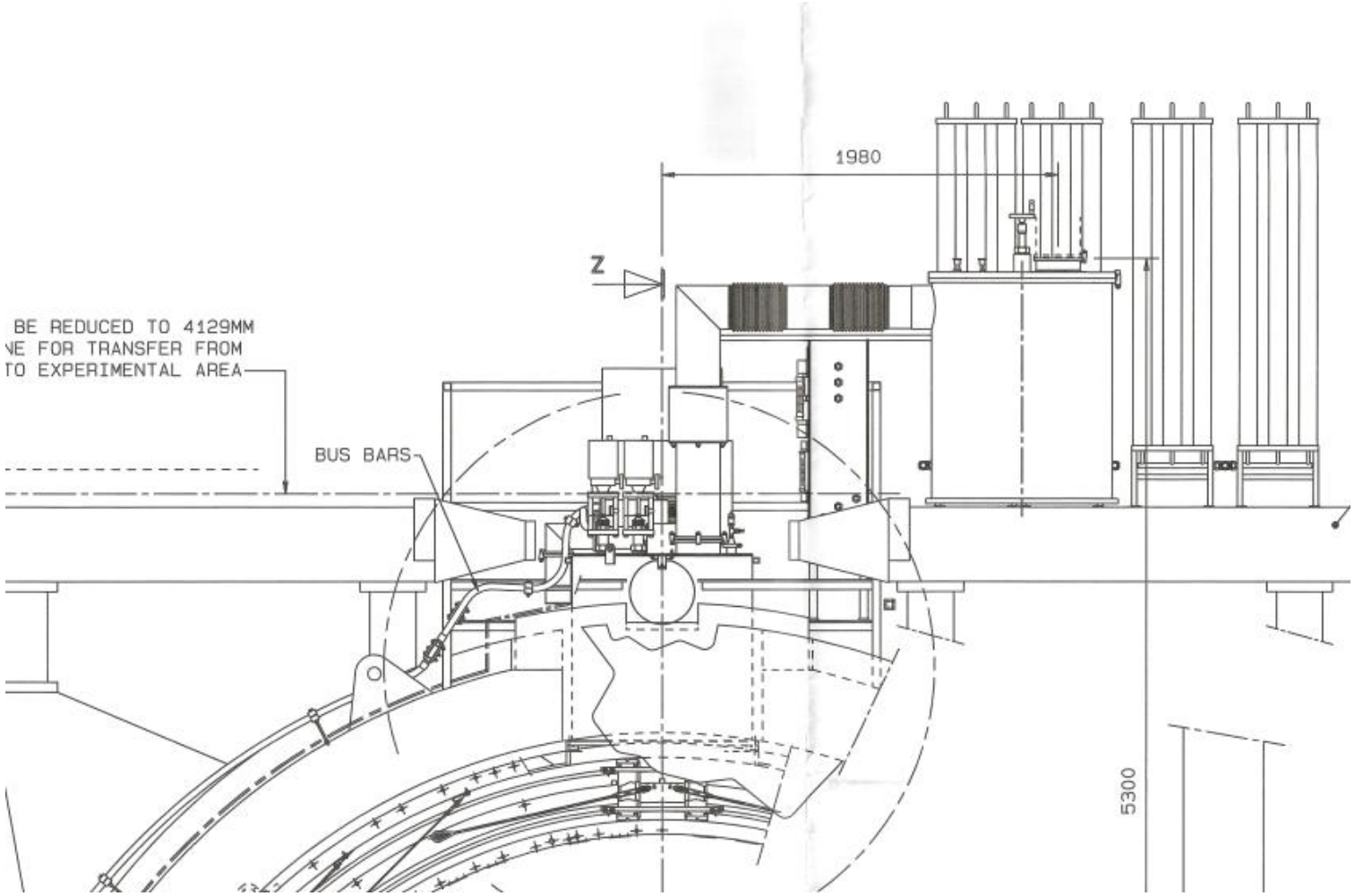
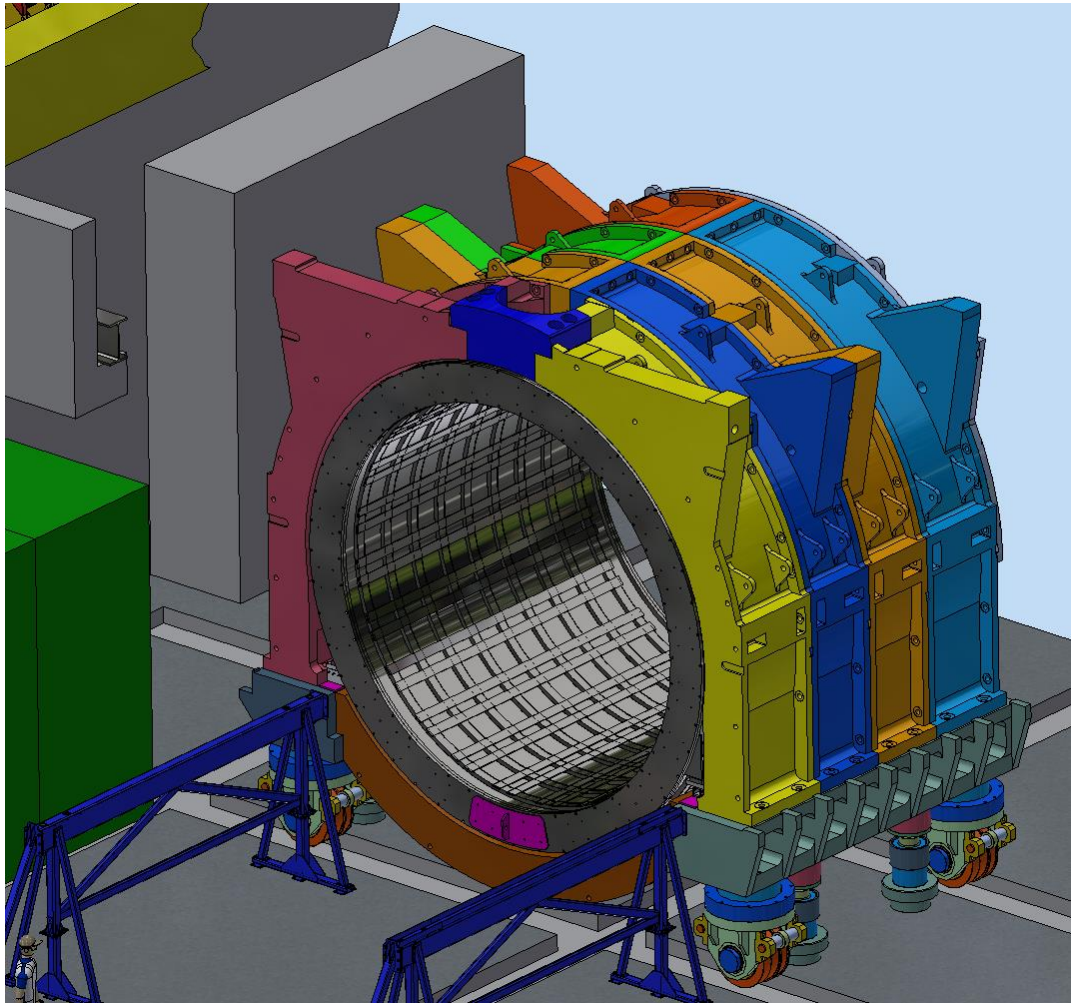
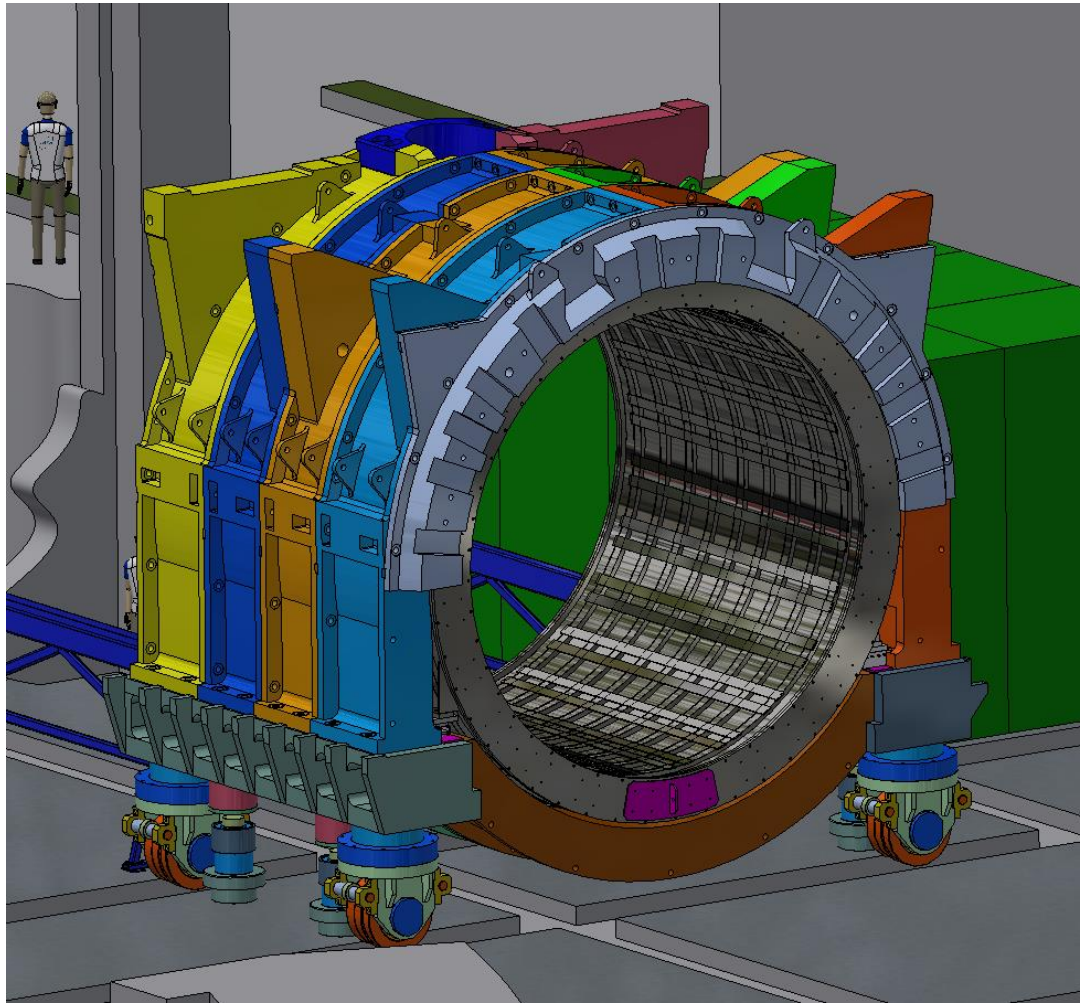


Rings removal

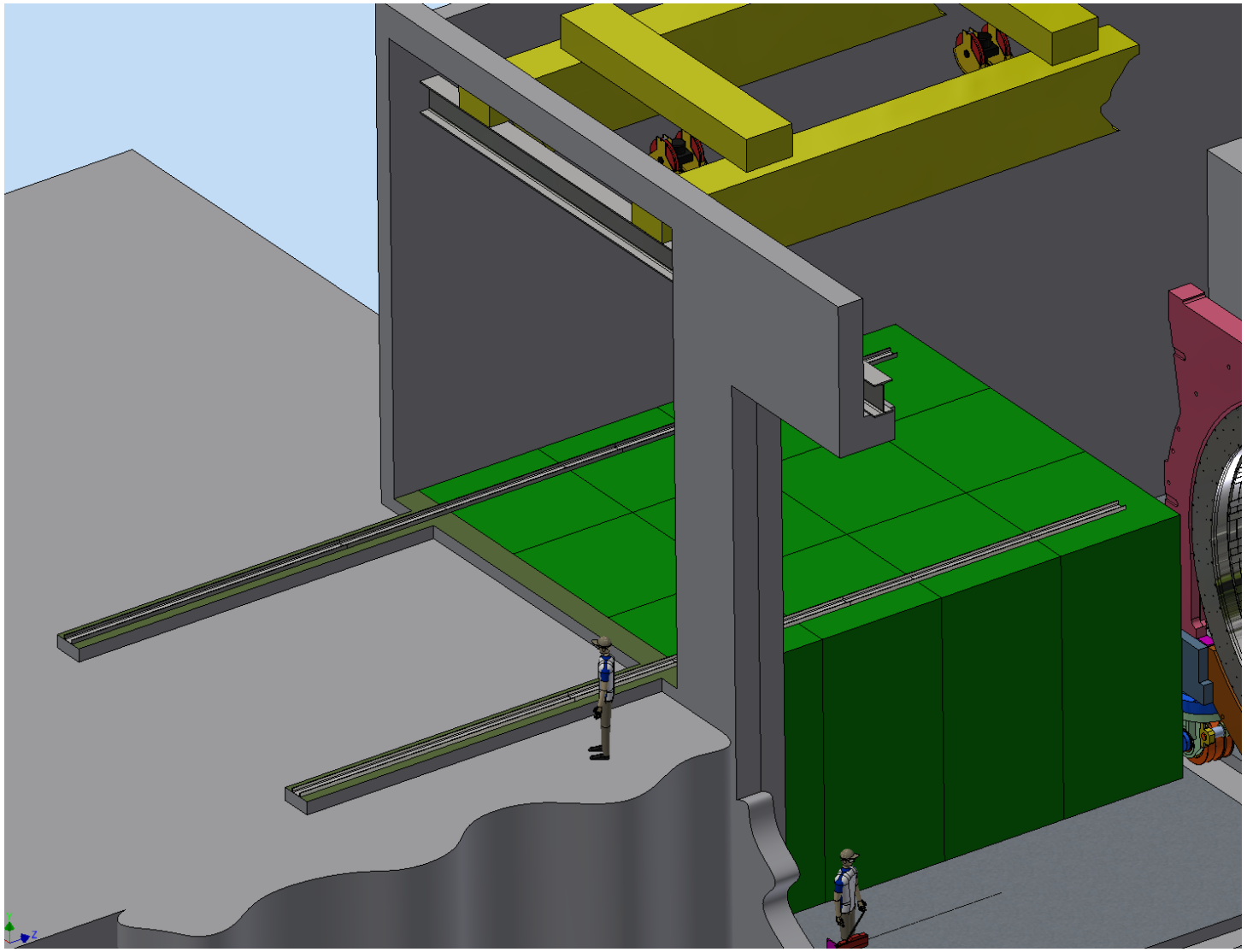


Front (parking side)



Back (DAFNE side)

Installation of loading dock and rails



The loading dock shall be extended to allow the magnet to be moved out of the assembly hall. The new design will include reinforced structures and appropriate safety measures to handle the weight and size of the magnet.

Two rails shall be installed to slide the magnet out of the assembly hall. The installation process will include precise alignment and secure anchoring of the rails to handle the weight and dimensions of the magnet.

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Organization

Organization

SAND Group will put in place a number of hardware experts (engineers/technicians) sufficient to complete the operations in the time allocated in the planning.
The team involved on the dismantling will be composed by:

- Work Package Leader (technical responsible);
- Site Supervisor
- Safety Coordinator (PSCe)
- GLIMOS
- Mechanical technicians (external staff): 3 technicians
- Technicians (INFN): 2 technicians
- Handling Team (external staff): 2 technicians

Name	Role	Organisation
Alessandro Saputi	Work Package Leader	INFN/FE
Federico Evangelisti	Mechanical Designer	INFN/FE
?	Technical Coordinator and Site Supervisor	INFN
Sandro Vescovi	Safety coordinator	INFN/LNF
Francesco Noto	GLIMOS	INFN/LNS
?	Mechanical technician	INFN
?	Mechanical technician	?
?	Mechanical technician	?
?	Mechanical technician	?
Ditta Polacchi	Handling team	External Staff


Thank You!!

KLOE Magnet: arrival in Frascati

Unloading phase

KLOE Magnet: insertion

KLOE Magnet: handling

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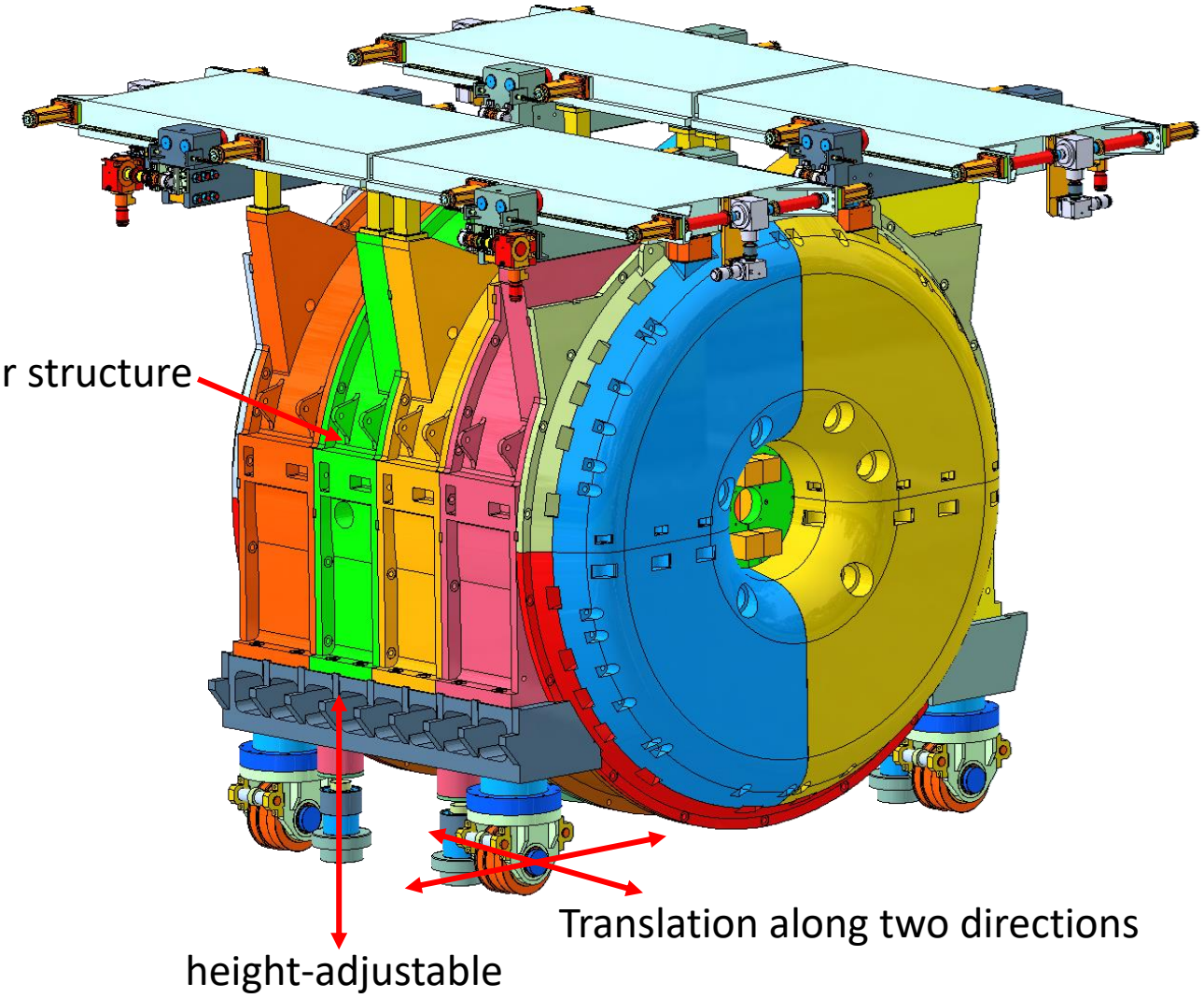

End cap with motorized opening