EUROPEAN
SPALLATION
SOURCE

European Spallation Source
J-PARC visit to ESS 2022

ESS update – ACF (Active Cells Facility) & cutting trials

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EUROPEAN SPALLATION SOURCE ERIC

2022-10-11

Agenda

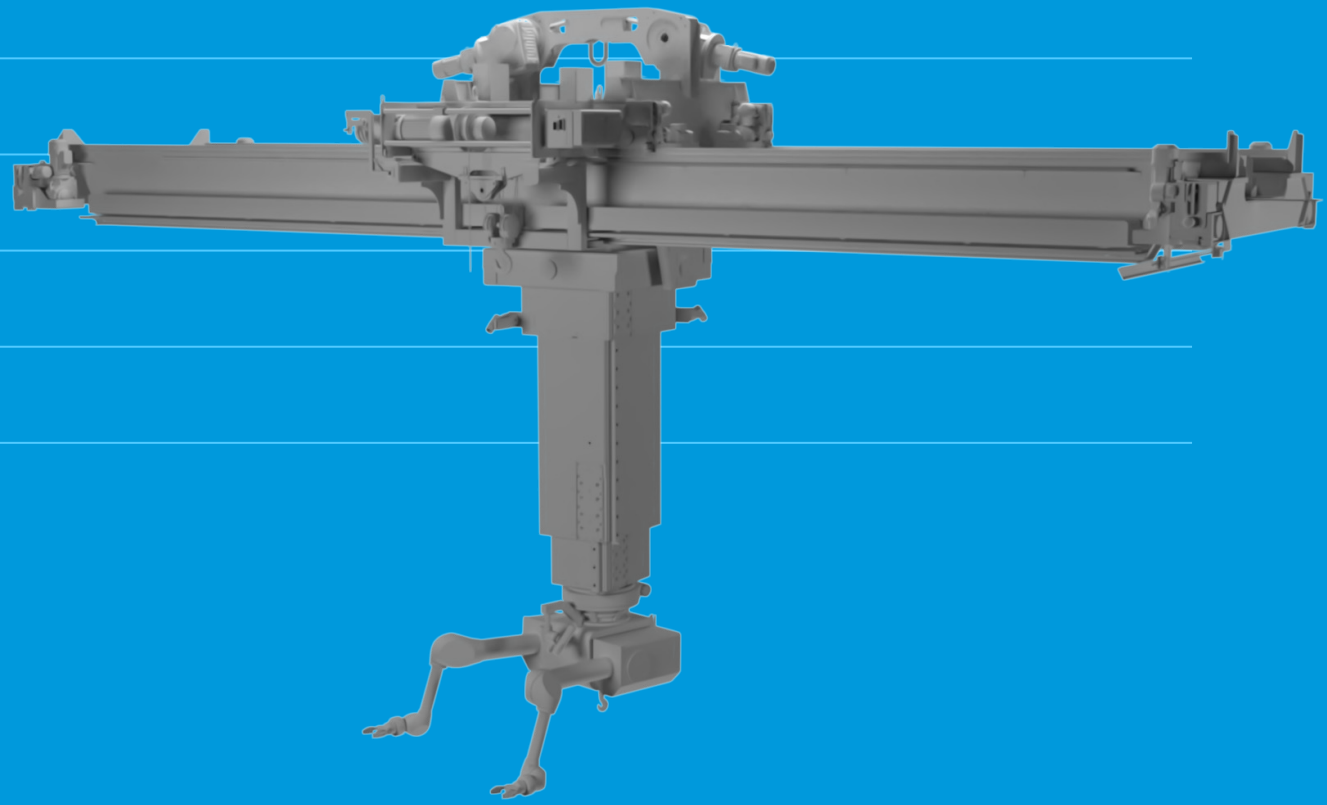
1 ESS & Target Overview

2 Remote Handling System (RHS) Overview

3 Active Cells Facility (ACF) Progress

4 Cutting trials

5 Site Progress



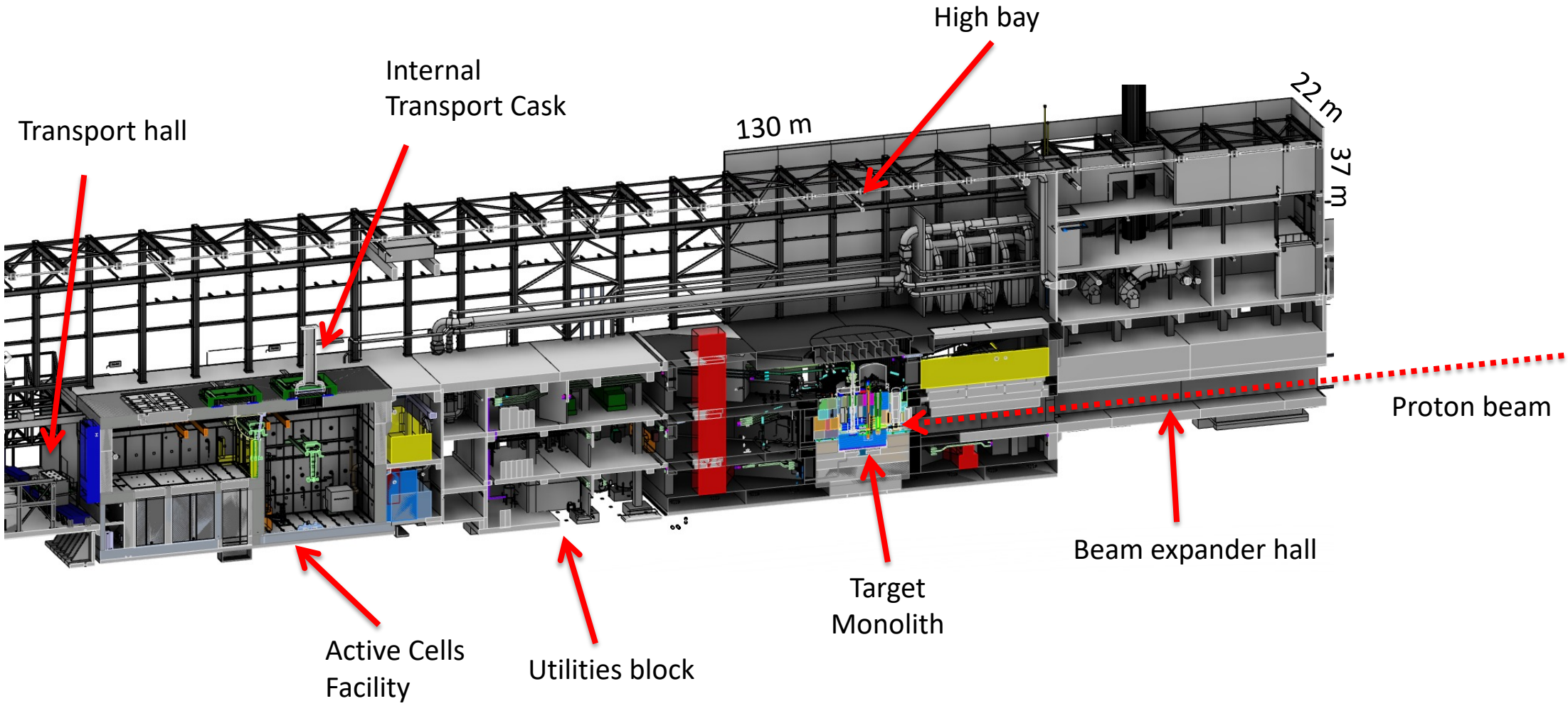
Where is ESS?

Lund, Sweden

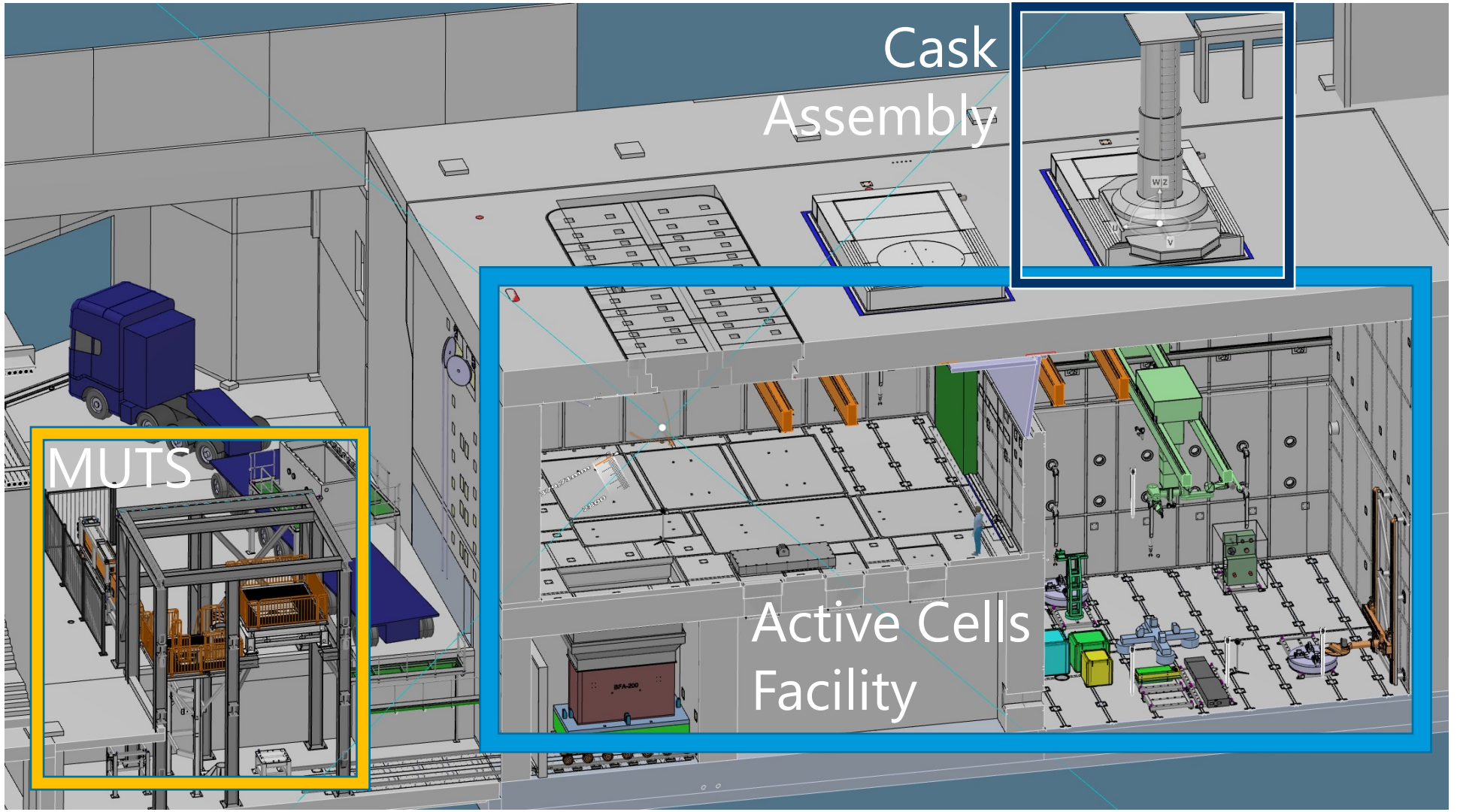
ESS

Target Station

Cut section of the D02 building



Remote Handling Systems

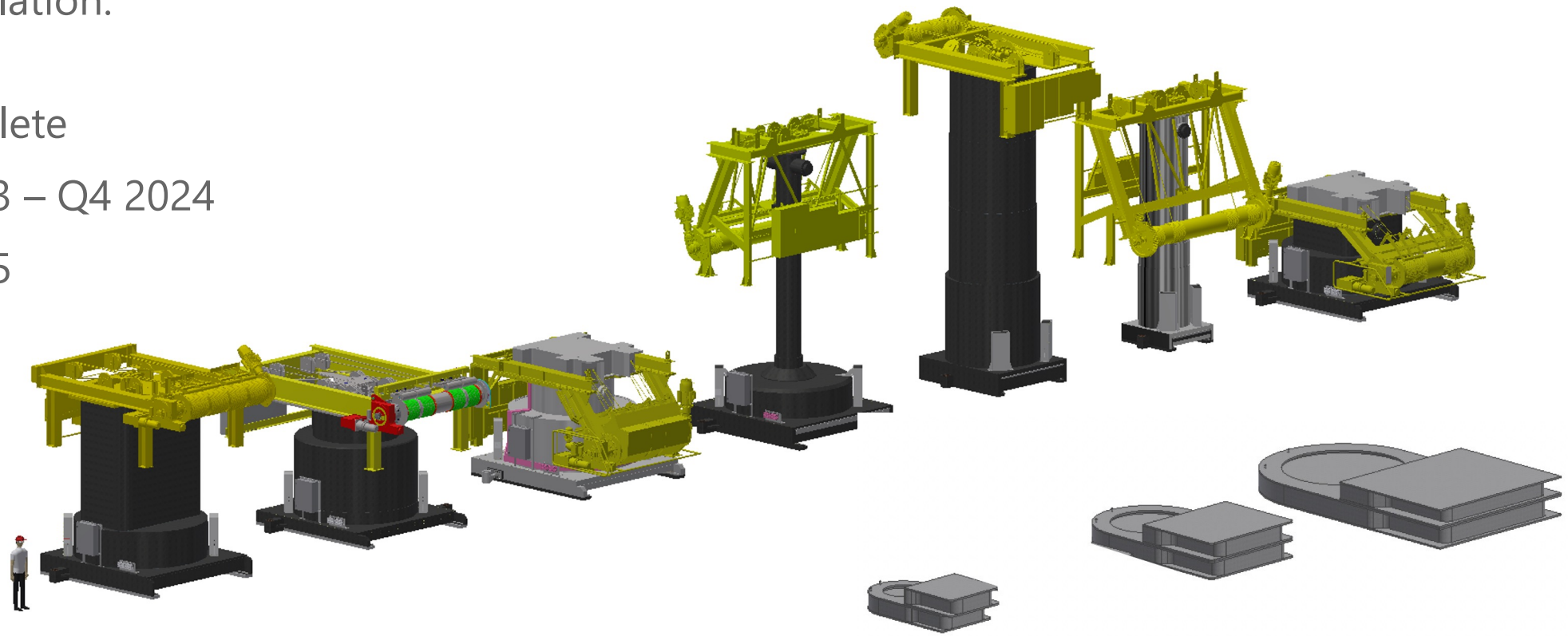


Cask Assembly

Seven casks and three monolith gamma gates

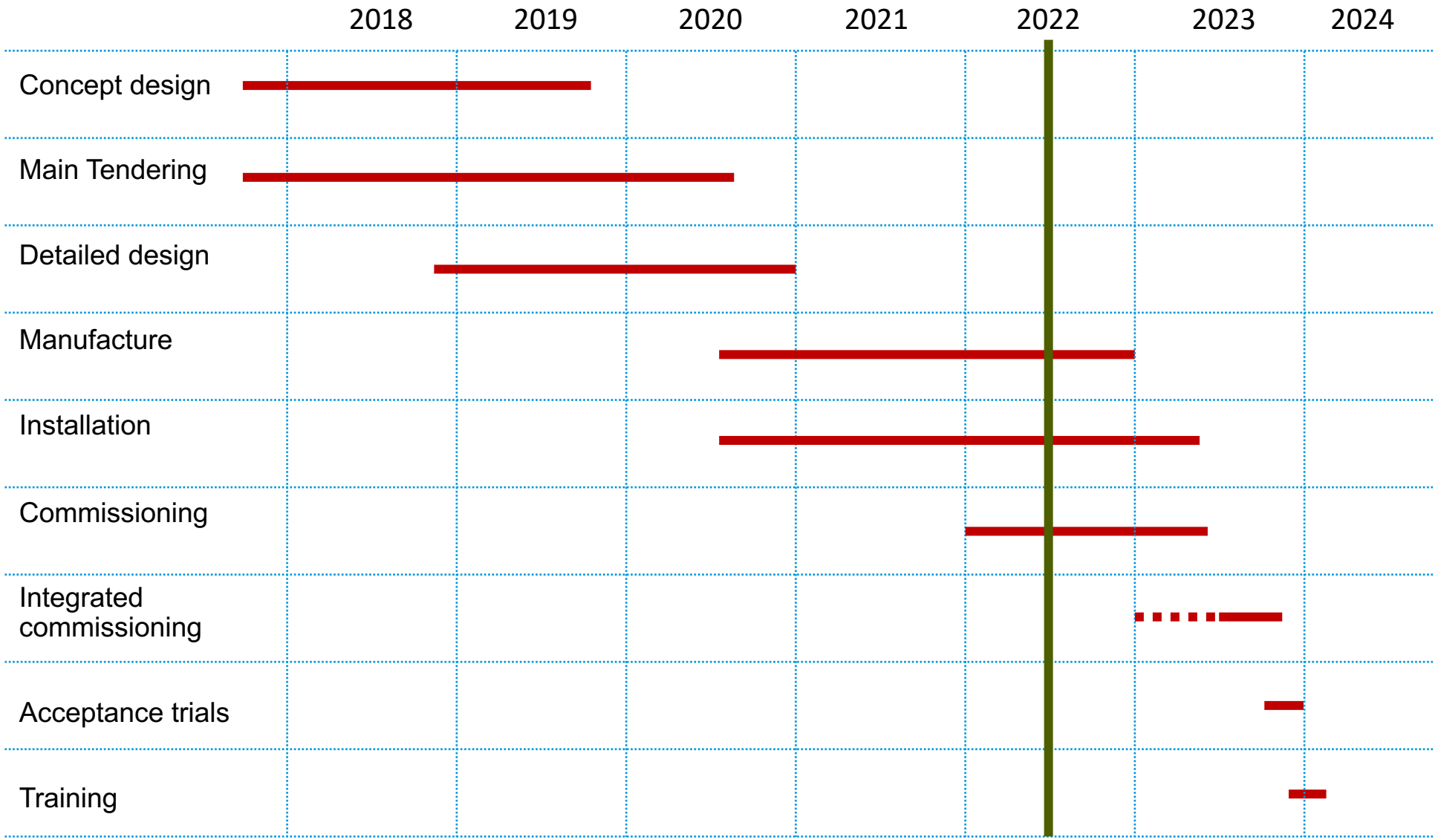
Hungarian Centre of Energy Research (CER) In-Kind group
Build and installation.

- Design: Complete
- FAT: Q2 2023 – Q4 2024
- SAT: Q1 2025



Active Cells Facility - High level schedule

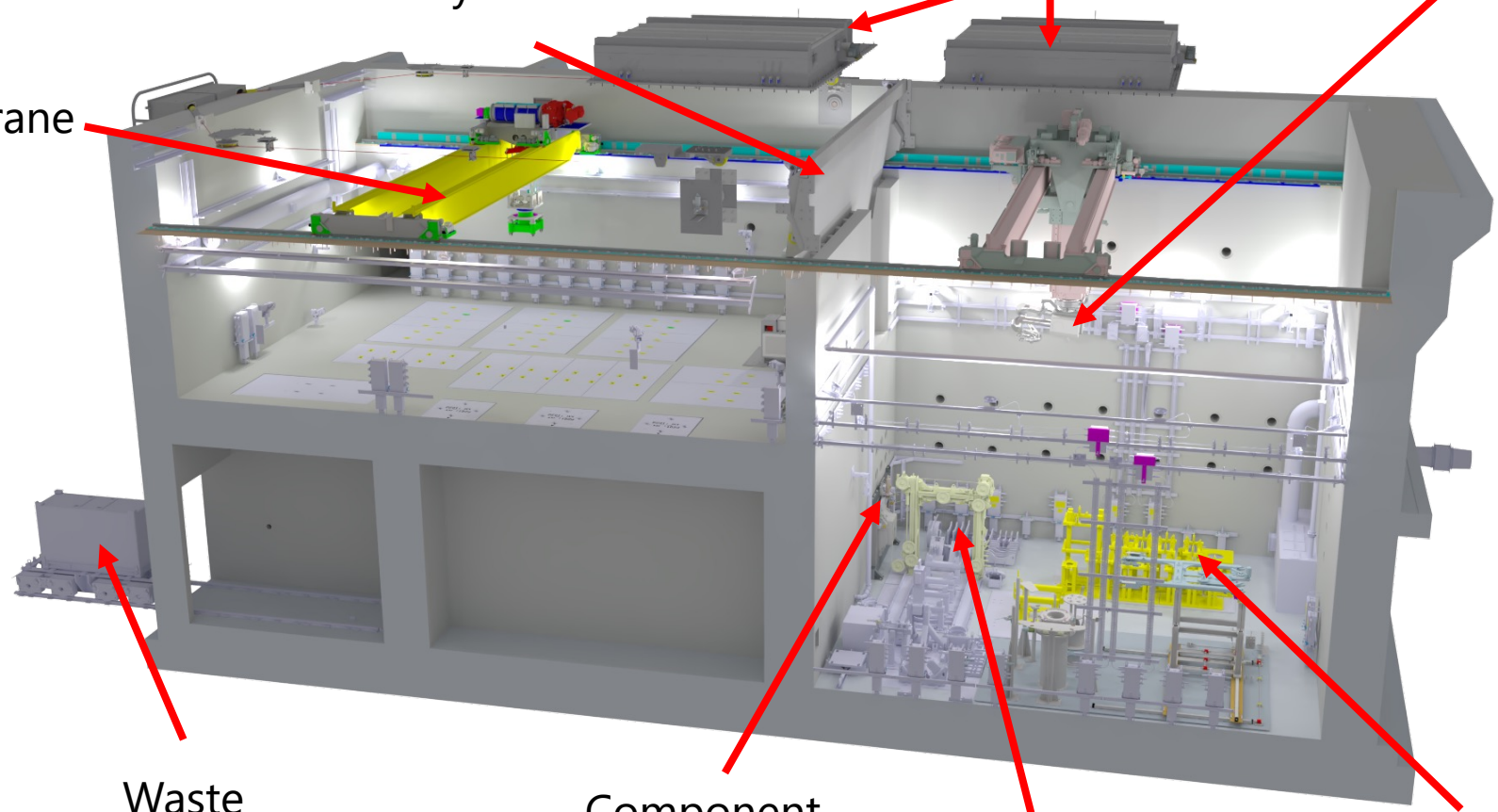
UKAEA / RACE In-kind delivery to ESS



- Majority of the Manufacture is completed
- Installations progressing
- Entering into commissioning phase

The Active Cells Facility (ACF)

World's largest windowless hotcell



Main Features:

- Built to handle waste in 100s Sv/h range
- 30x15x12 m (LxHxW)
- 1.3 m High Density Concrete
- No windows
- Process Cell
- Maintenance Cell
- Waste storage
- Waste shipment

ACF

Images from 2019

ACF

2022

Waste Transfer System

Current Status

Contract: Aquila
Design, build and **install**

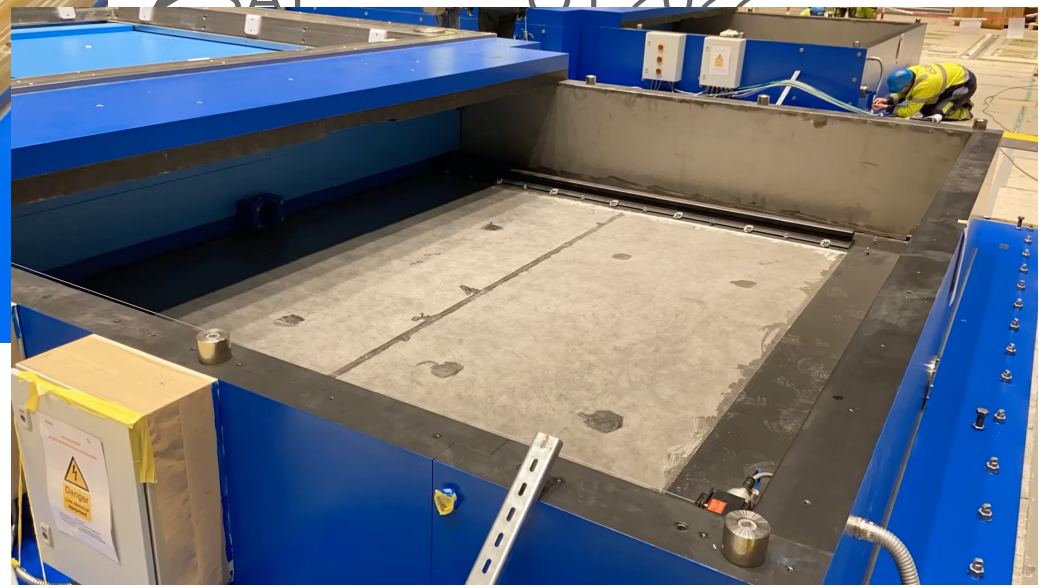
➢SAT: Q1 2022

Floor Valves

Current Status

Contract: Ansaldo (Asturfeito)
Design build & install
(**Complete)**

- SAT: Q1 2022



Intrabay doors (Upper and Lower)

Current Status

Contract: Ansaldo (Asturfeito)
Design build & install (**Complete)**

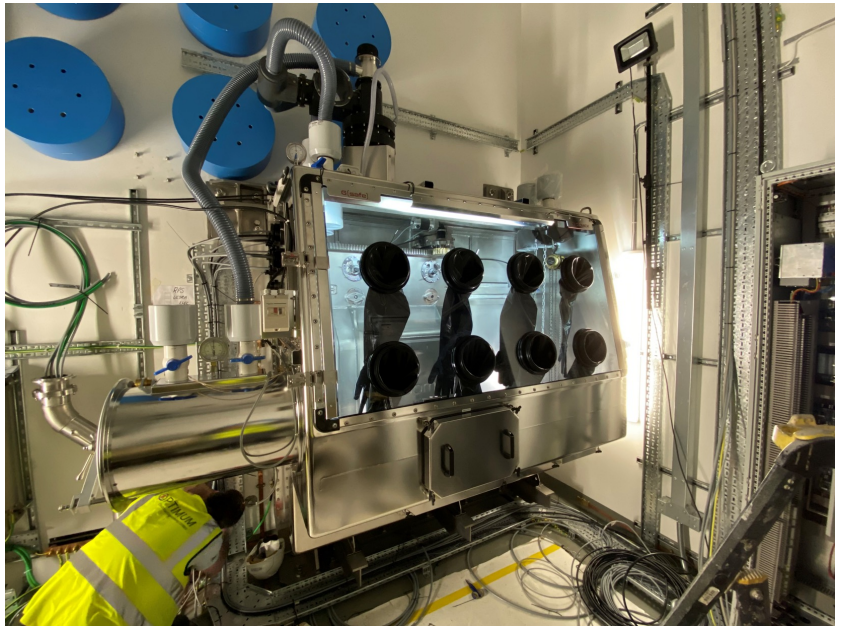
- SAT: Q1 2022

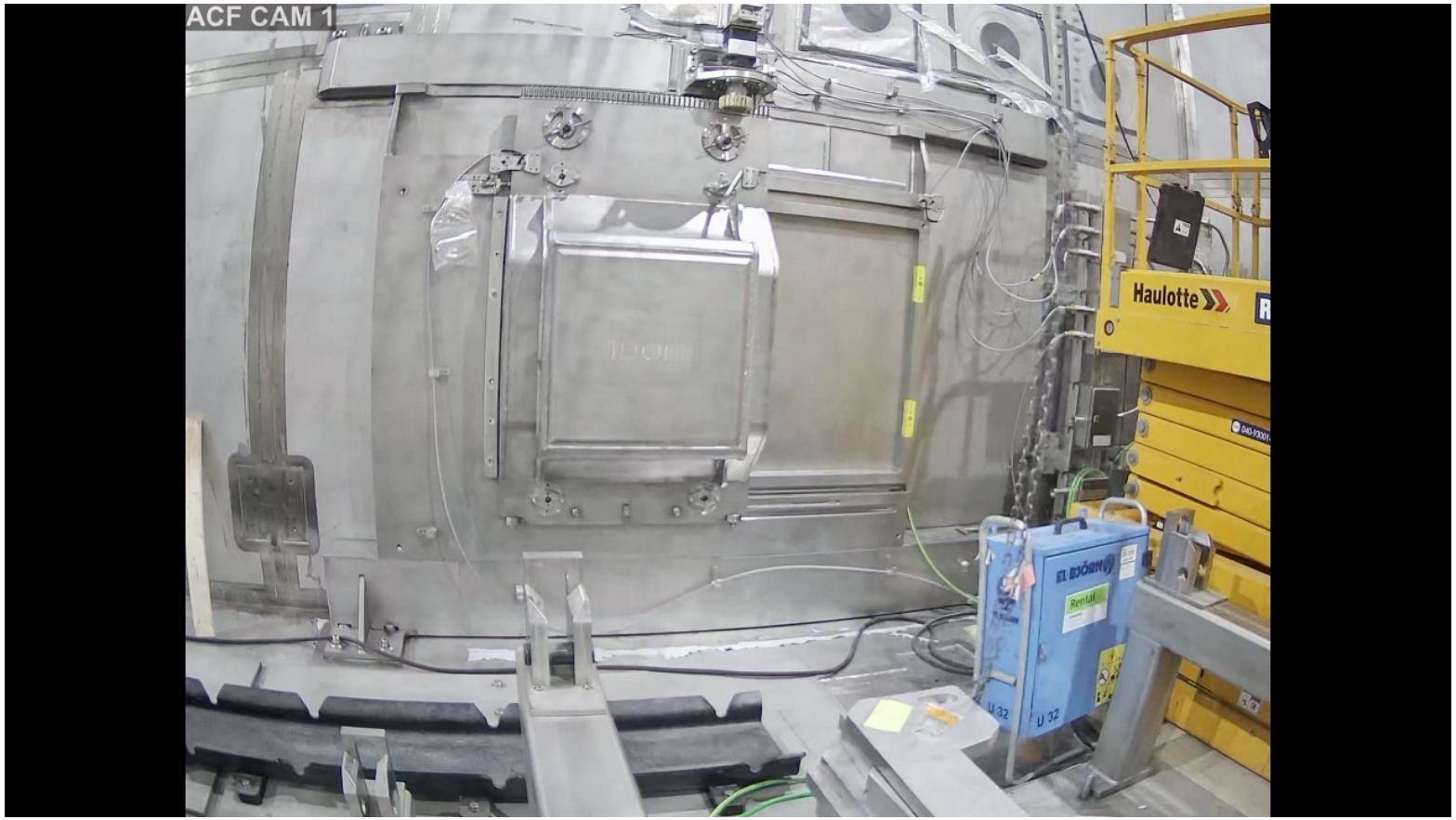
Component Transfer Hatch

Current Status

Contract: IDOM (Jacomex)
Design, **build** and install (Complete).

➢SAT: Q2 2022





Storage Pit lids

Current Status

Contractr: The Abbey Group (Amber Precast)

Design, build and **install**

- FAT: Q2 2022
- SAT: Q3 2022

Storage Pit lids

Current Status

Contractr: The Abbey Group (Amber Precast)

Design, build and **install**

- FAT: Q2 2022
- SAT: Q3 2022

Grapple Crane (25T)

Current Status

Contract: James Fisher Nuclear (SCX)

Design, build and **install**

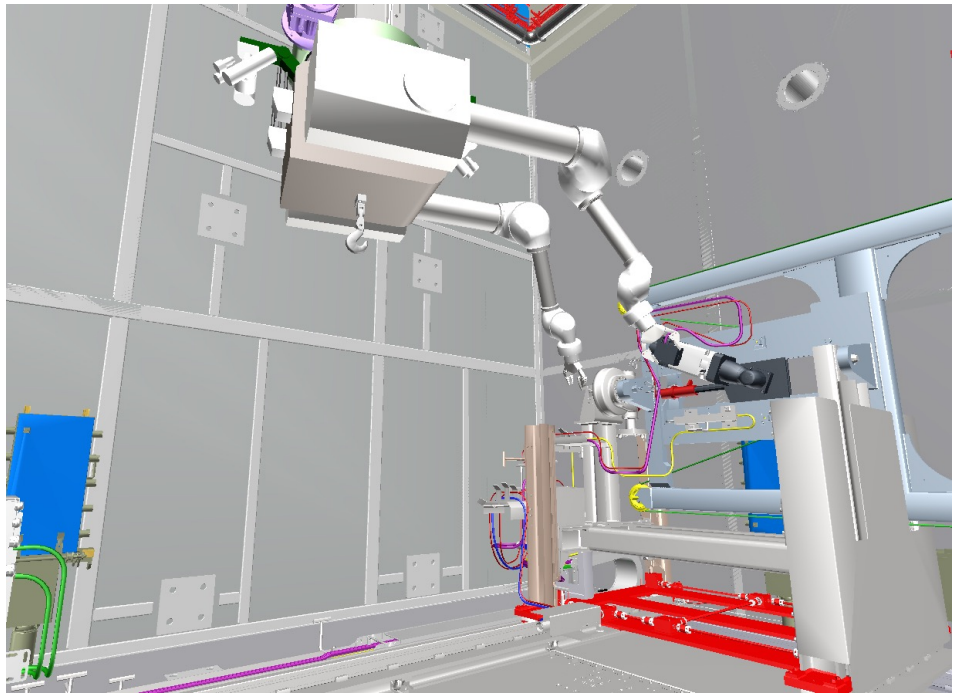
- FAT: Q2 2022
- SAT: Q3 2022

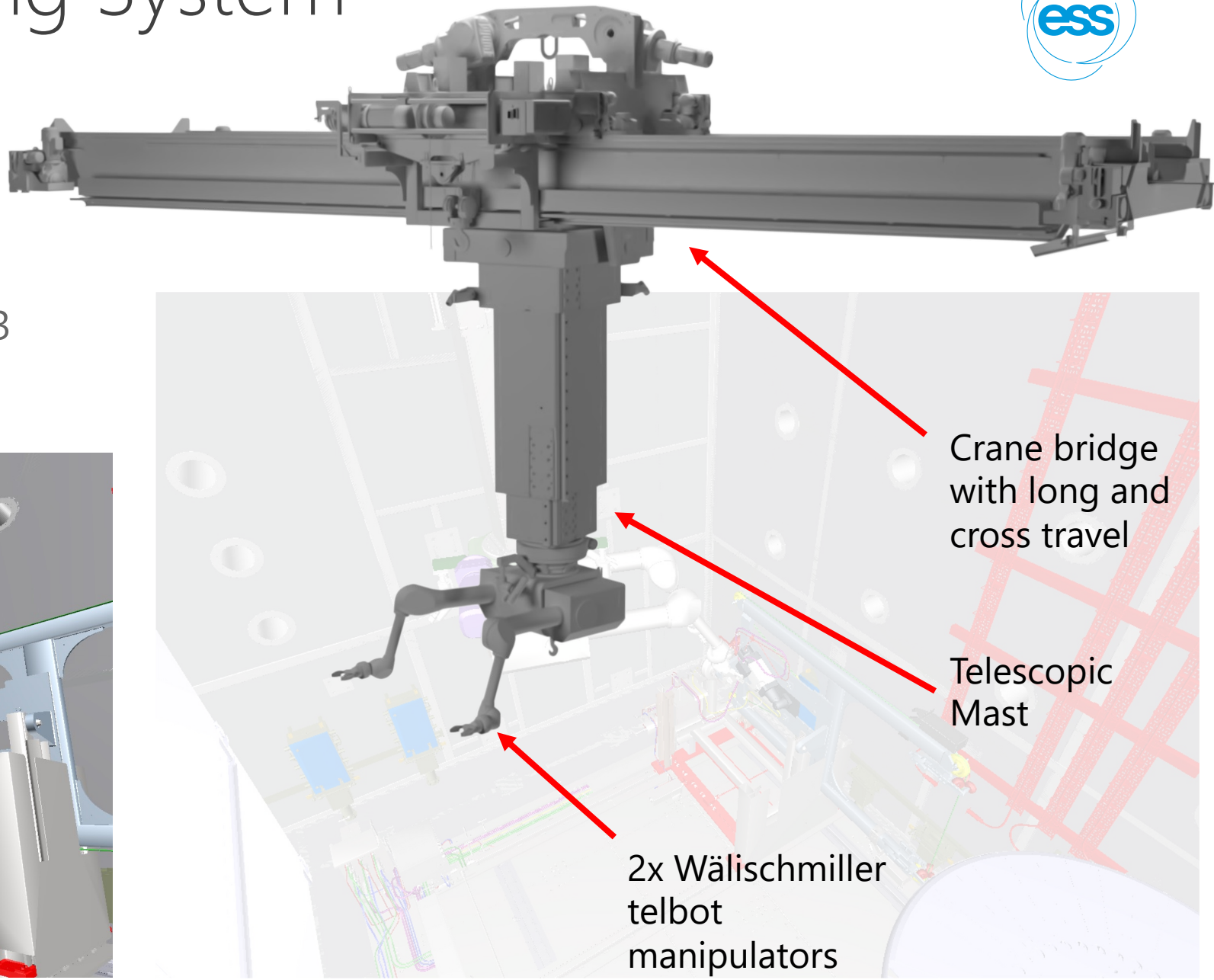
Robotic Handling System

Current Status

Contract: James Fisher Nuclear Design, **build** and installation.

- Design: Q2 2022
- FAT(arms/RHS): Q2 2022 / Q1 2023
- SAT: Q2 2023



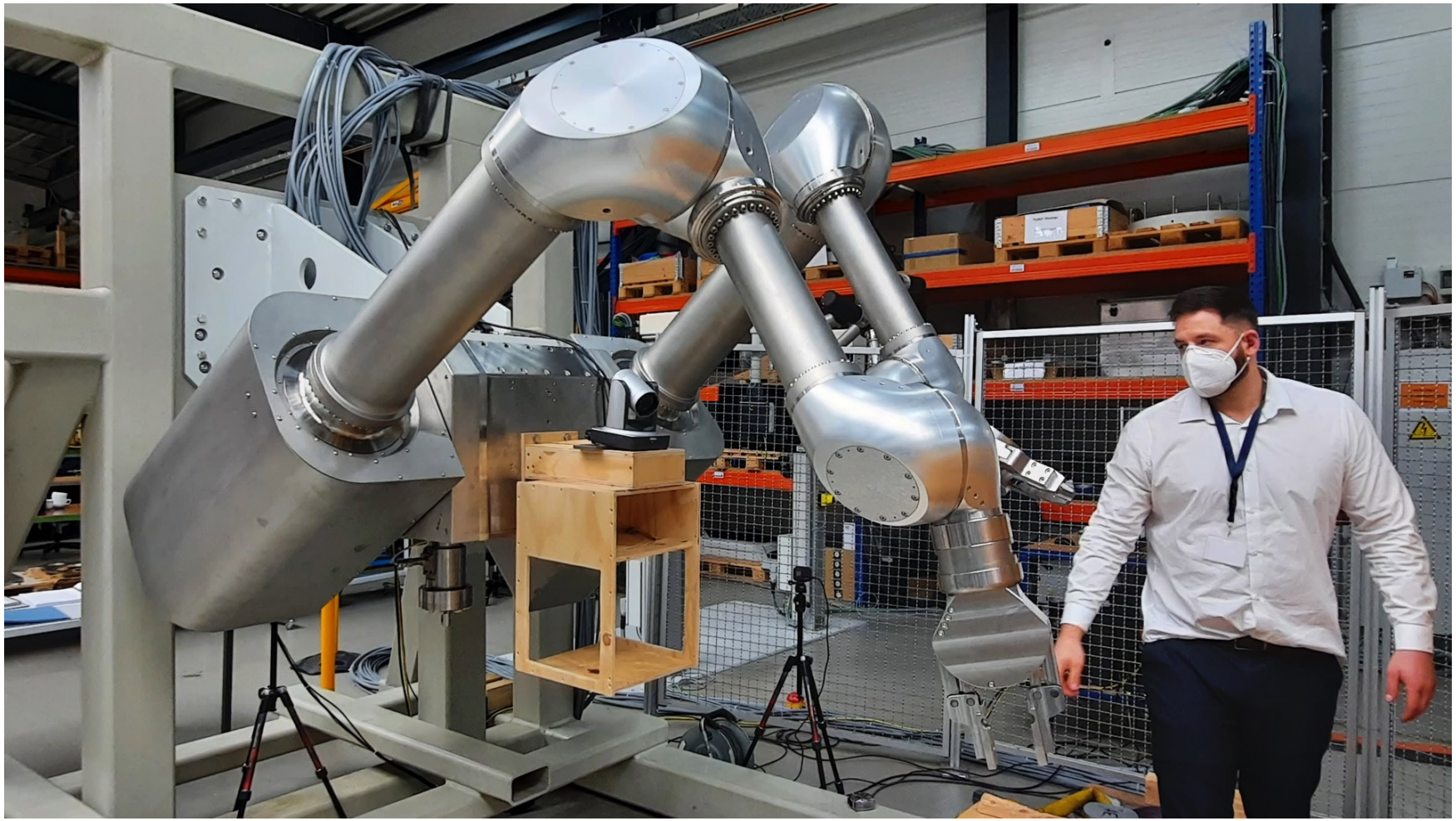


Robotic Handling System

Current Status

Contract: James Fisher Nuclear
Design, **build** and **install**.

- Design: Q2 2022
- FAT(arms): Q2 2022
- FAT(RHS): Q1 2023
- SAT: Q2 2023

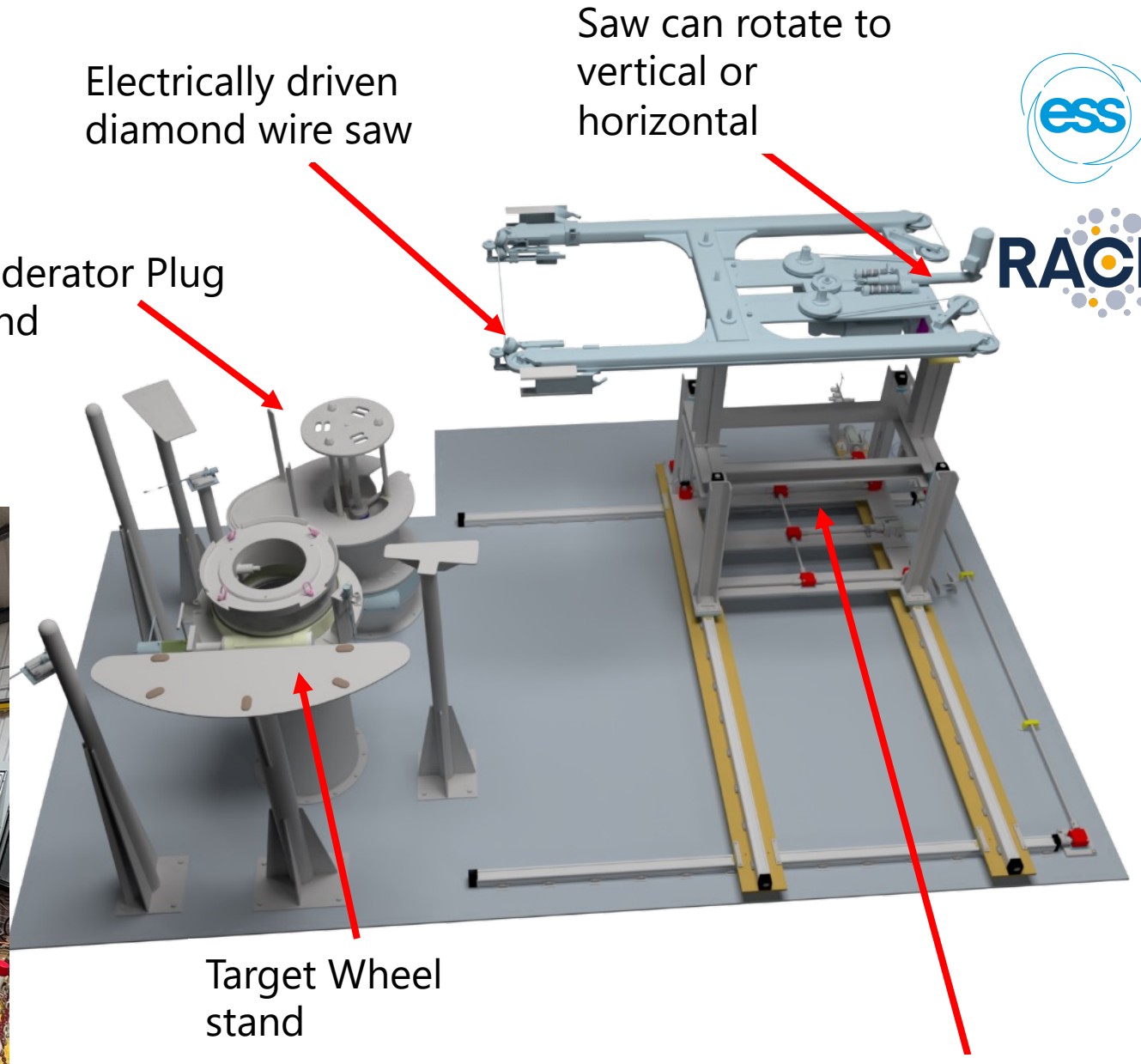


Machining Station

Current Status

Contract: James Fisher Nuclear
Design, **build** and install

- FAT: Q1 2023
- SAT: Q2 2023

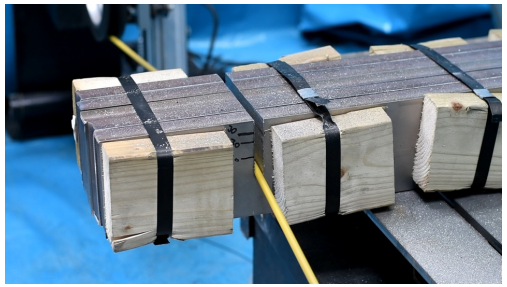


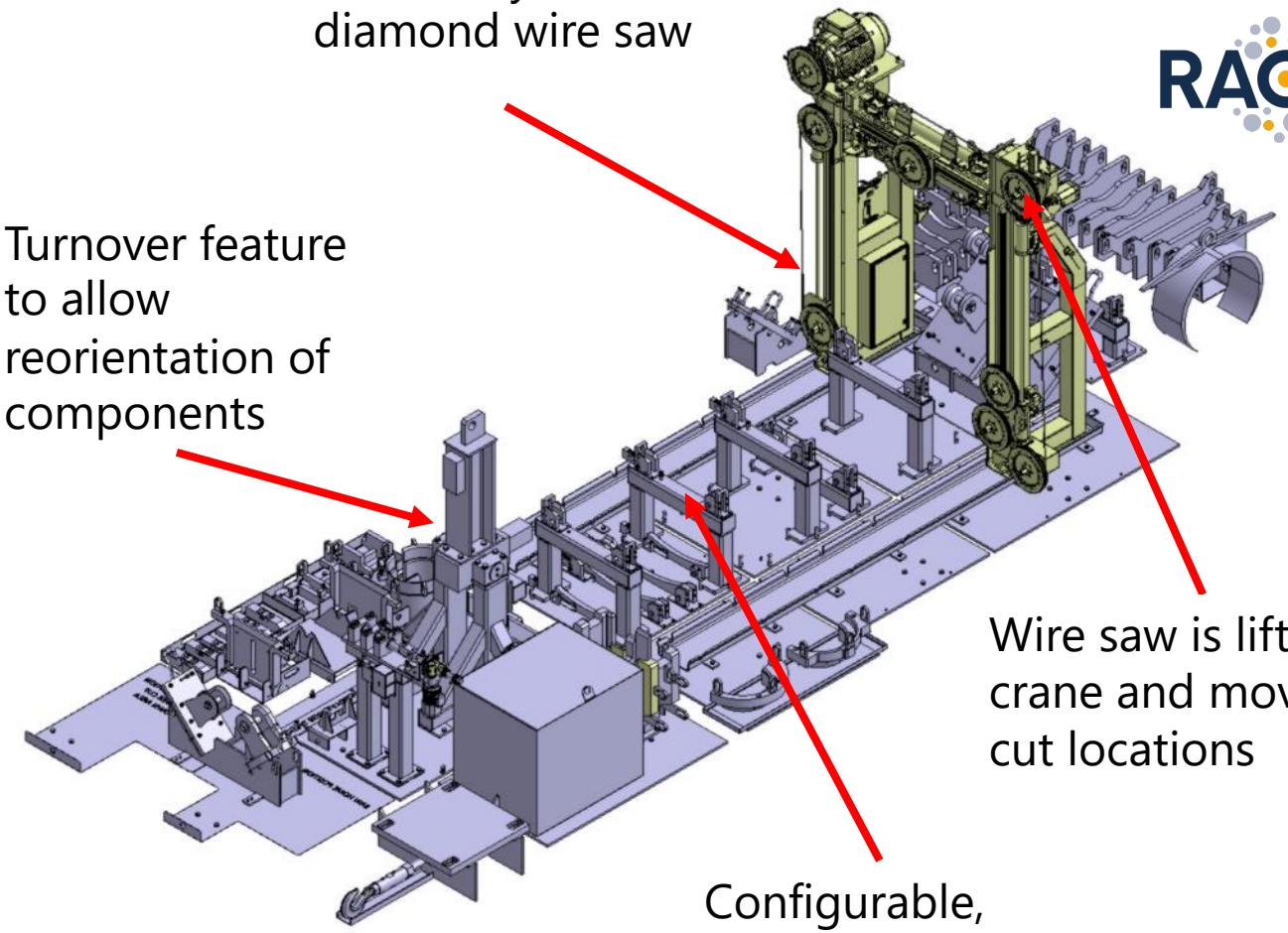
Shaft Cutting Station

Current Status

Contract: Aquila
Design, build and install

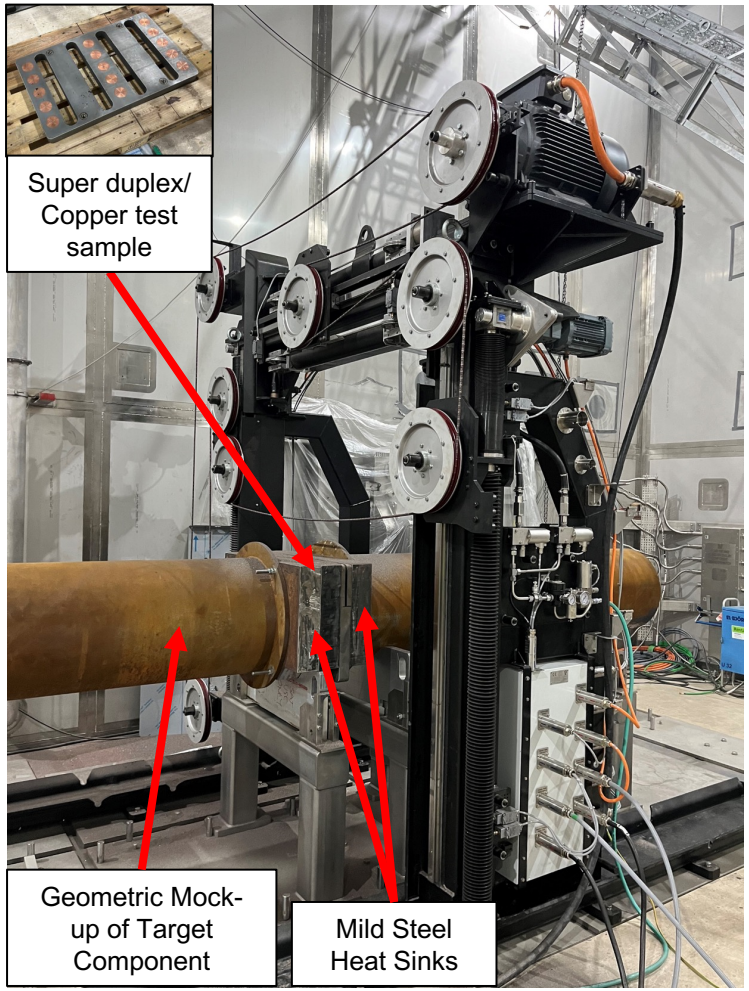
➢SAT: Q3 2022





Saw Test Sample

Use of representative sample

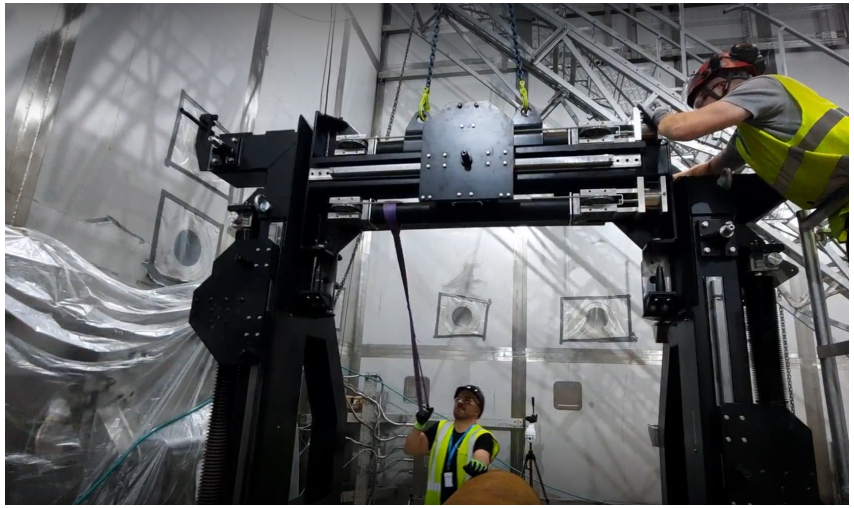


Moderator Reflector Plug Mock-Up (Post irradiation)

- Size: 800mmx500mmx50mm
- Material: Super Duplex Stainless Steel, and copper inserts.
- Heat sink (clamped mild steel)
- Support with component adaptors

Saw Assembly – Main Frame

Designed for Remote Handling

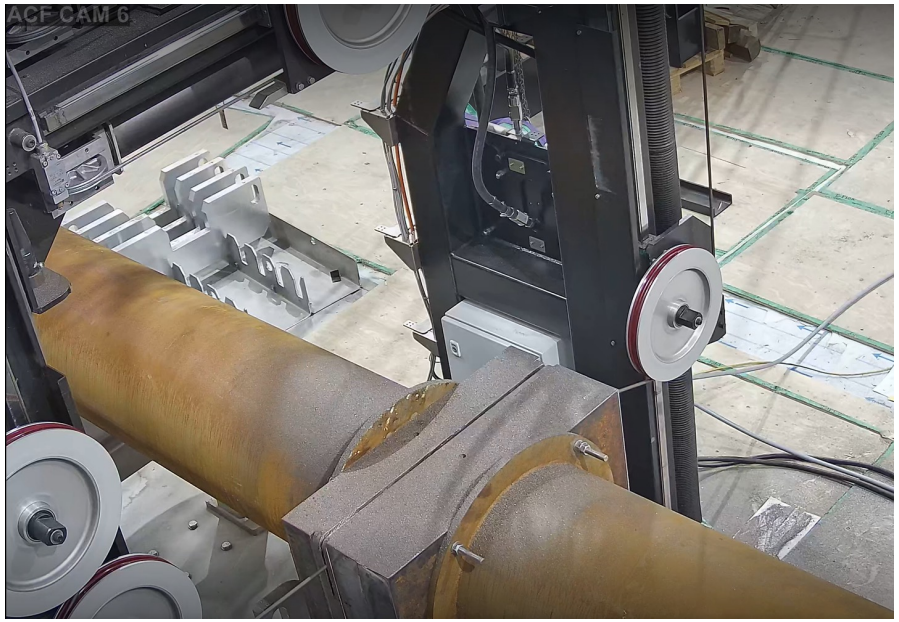


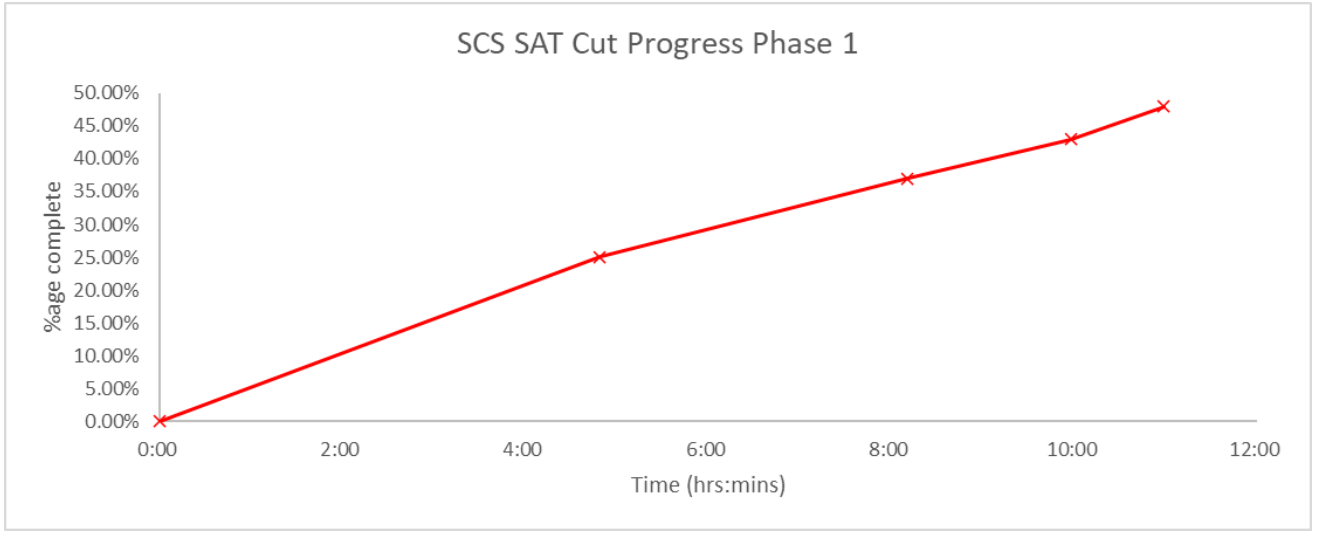
Saw Assembly – Small LRUs

Line Replaceable Units

Cutting

Designed for Remote Handling

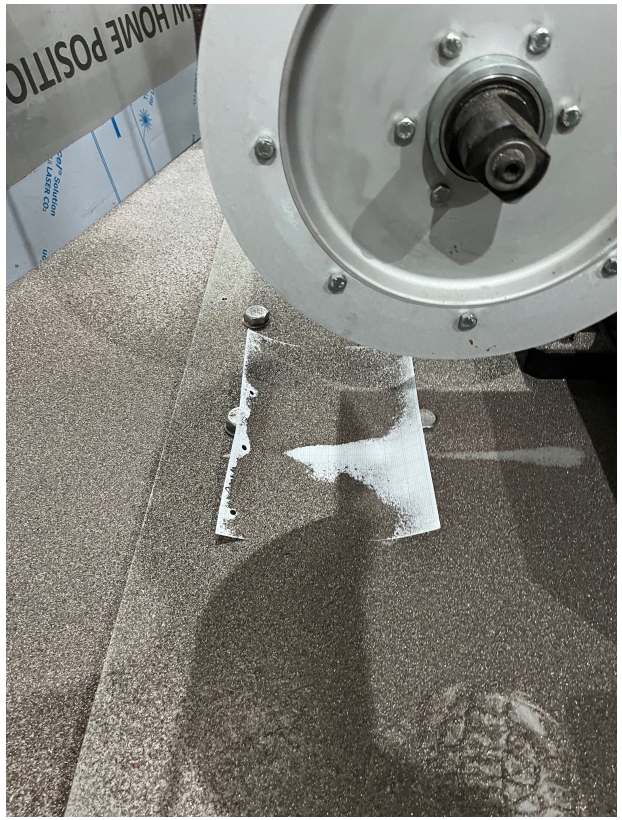




- 11 hours of cutting over 2 days
- 50% progress
- 2 wires used
- Delays: initial assembly, and running out of fresh cutting wires
- 2nd cutting trial planned in November to complete cut

Swarf

Sward distribution monitored and documented



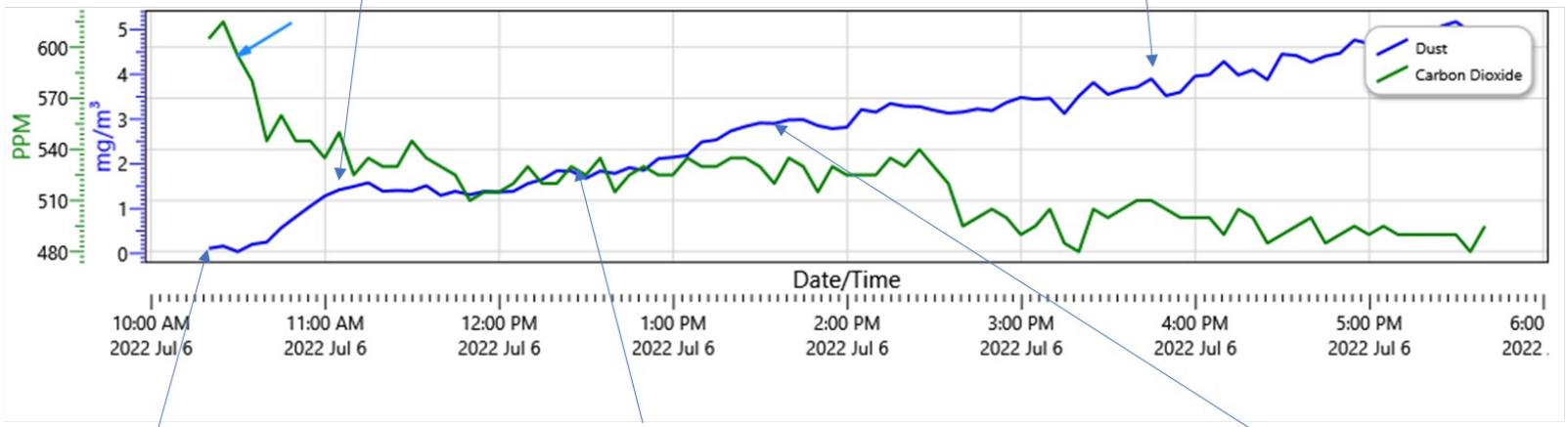
Dust – day 1

No air extraction used

Day 1 – Airborne Dust Levels

1201 Swedish Time - Cut stopped for lunch

1650 Swedish Time – Dust Monitor moved directly next to saw.



Total Cutting Time: 4:49

1125 Swedish Time – Cutting begins. Dust Monitor 1m from saw.

1323 Swedish Time – Cut restarts. Dust monitor 2m from saw.

1430 Swedish Time – unexpected raised dust levels noted, masks required for cell entry before it settles.

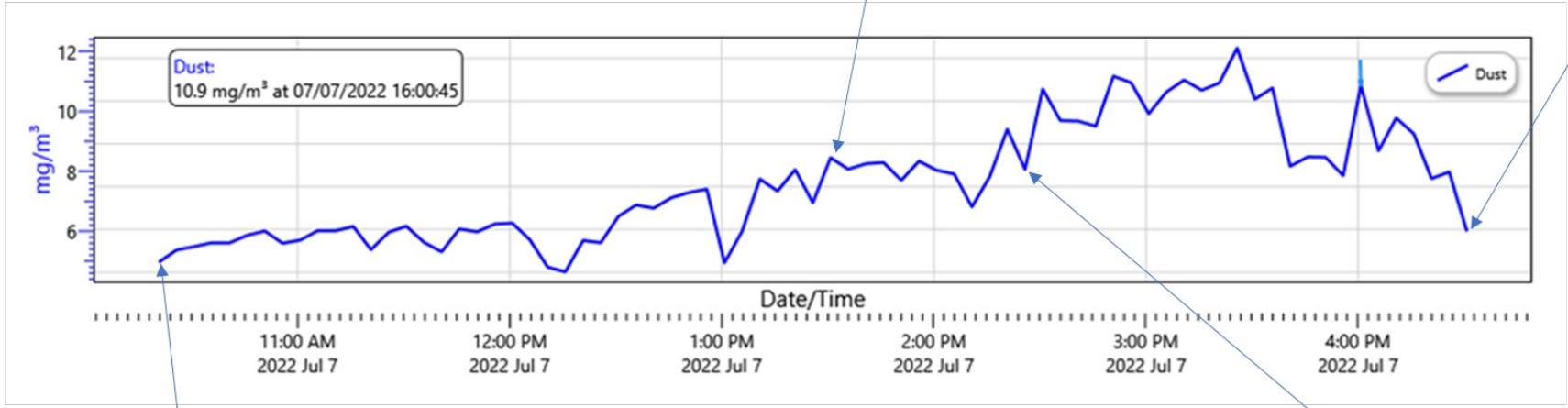
Dust – day 2

No air extraction used

Day 2 – Dust Levels

1430 Swedish Time - Cut stopped and EVM moved to PC floor, 3m from saw. Cut then restarts.

EVM retrieved.



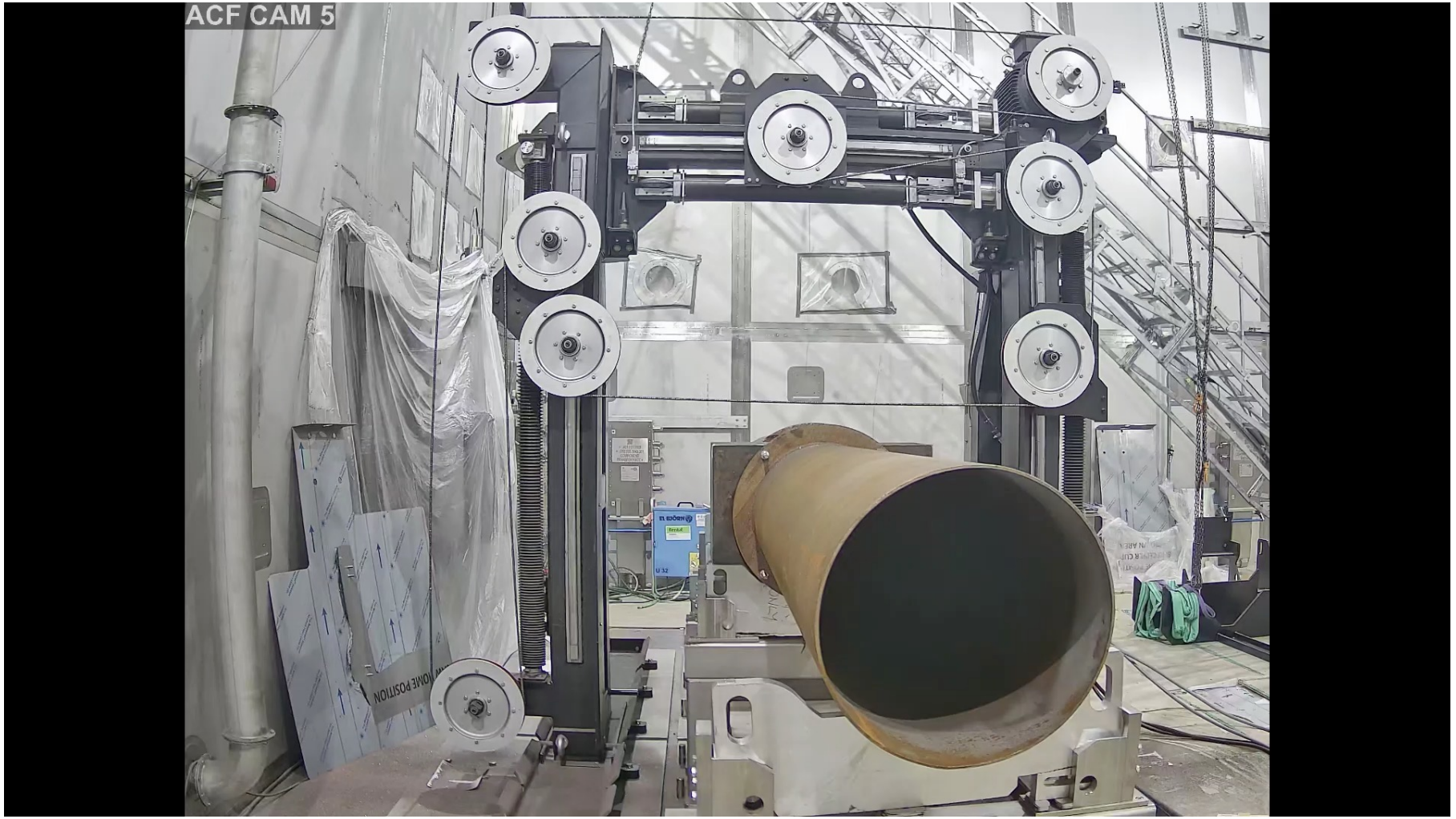
Total Cutting Time: 7:11

1115 Swedish Time - EVM placed in Intrabay door after 4 hours continuous cutting

1537 Swedish Time - Cut stopped – end of cutting for the day.

Cutting trials

Stuck wire recovery



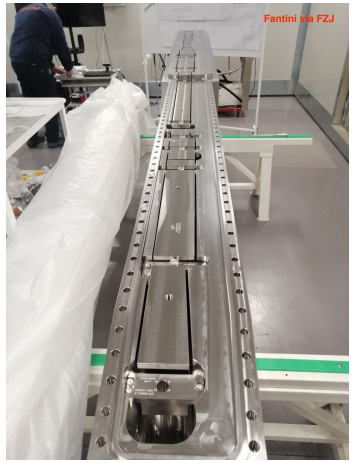
Site Progress

(Target)

Project Highlights - Target

Target wheel ribs in place and finished welding.

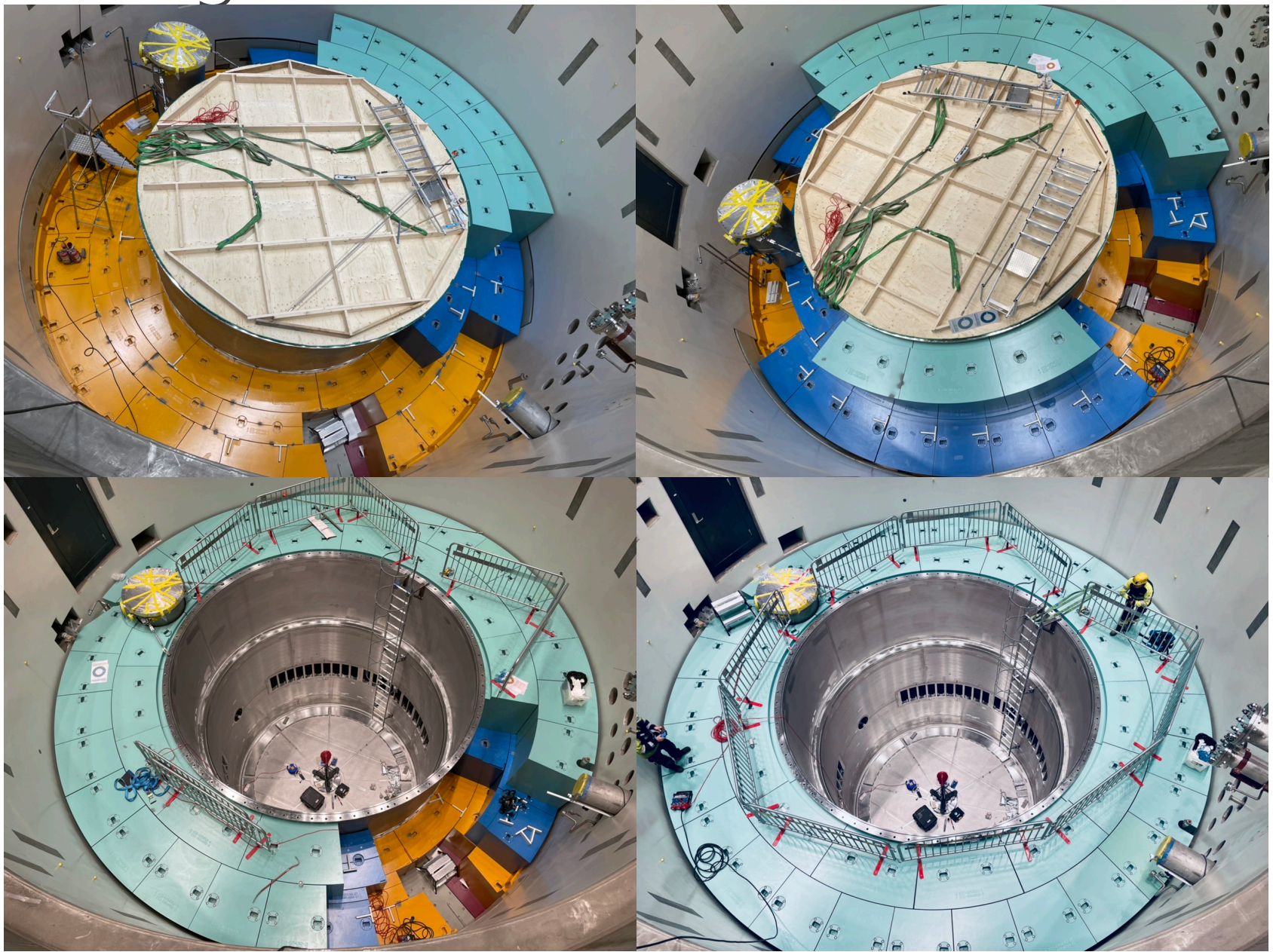
Target wheel assembled in ESS (image does not show shaft)



Moderator Reflector Plug (top)
Neutron Beam Port Block (left)
Open NBPI with back fillers installed (right) before shipment to ESS for neutron optics

Monolith Vessel installation

Target Monolith



All shielding outside the monolith vessel is in place. Roughly 1700 tons in the form of stacked cast iron blocks.

MUTS (Testing in…)

Mock-up and Test Stand

A view of the Target Wheel disk from beneath will become a rare thing

Thank you for your time

Site View 2022-09

Any Questions?

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