

XLZD



XLZD COLLABORATION MEETING > 30 JUNE – 2 JULY 2025 > LNGS

XLZD @LNGS



Marco Selvi
INFN Bologna



XLZD Collaboration meeting, 30 June 2025, LNGS

Shielded by 1400 m (3800 m.w.e.) of rock
(Gran Sasso Mountains)

Total Muon flux $3 \cdot 10^{-8} \text{ cm}^{-2} \text{ s}^{-1}$

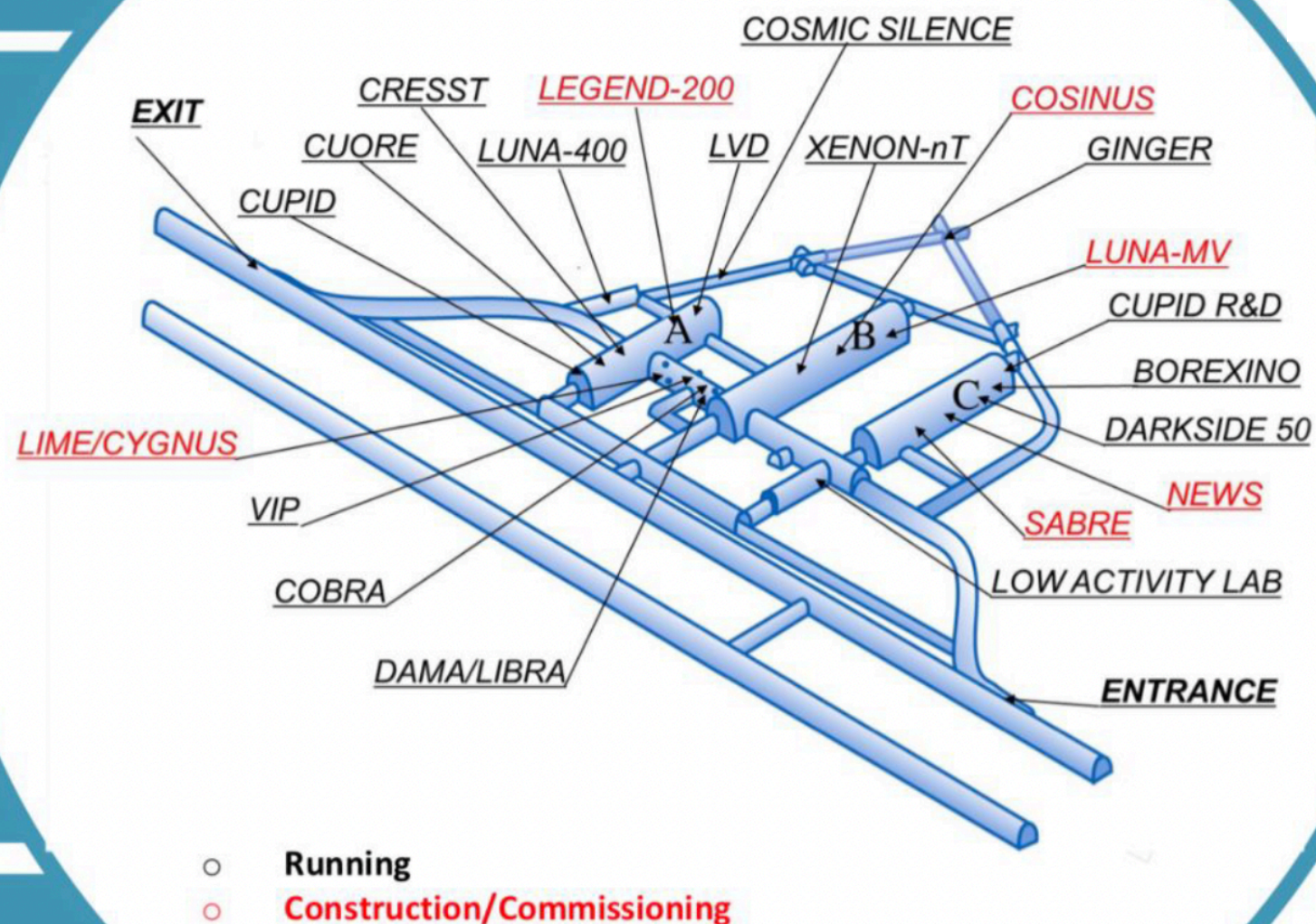
Easy access directly from the A24 highway

3 main experimental halls
100 m long, 20 m width and 18 m high

Many small tunnels for lab facilities and
small experiments

Actually there are 14 (20) experiments in
data taking or under construction

Very sensitive laboratory for very low
radioactivity measurements



Area: 17.800 m^2

Volume: 180.000 m^3



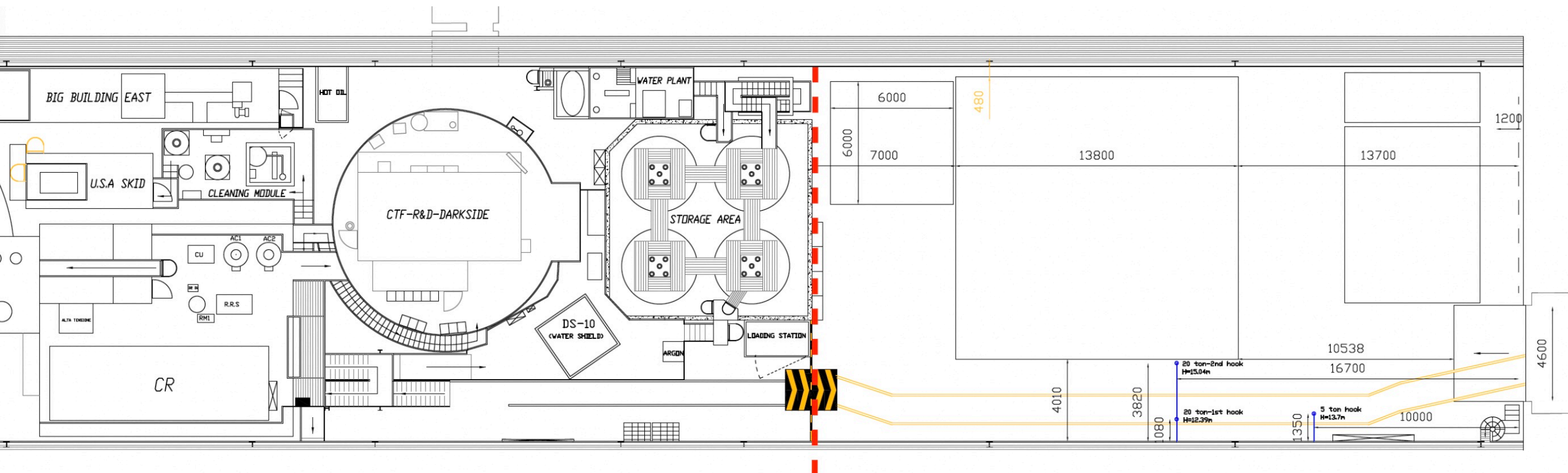
Underground Site



Current status of Hall C @LNGS

Borexino + CTF

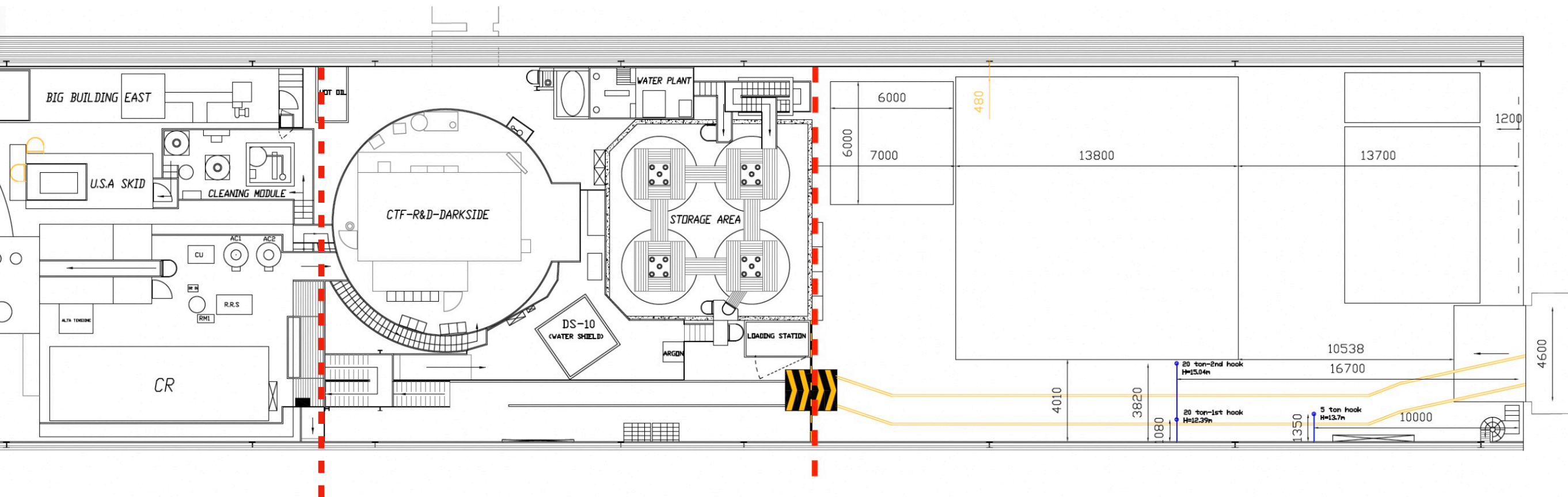
Darkside-20k



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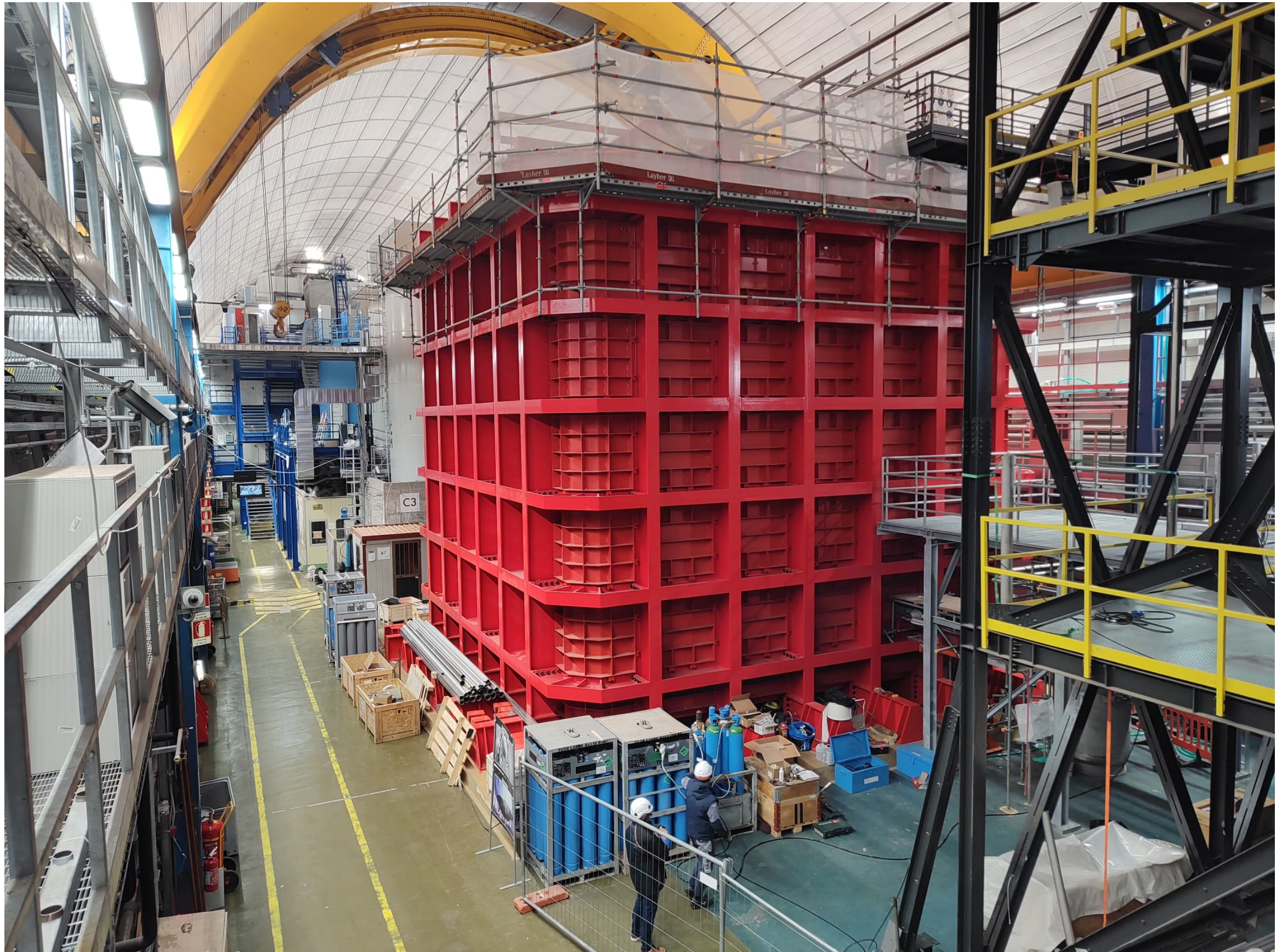


LEGEND-1000

XLZD

Darkside-20k

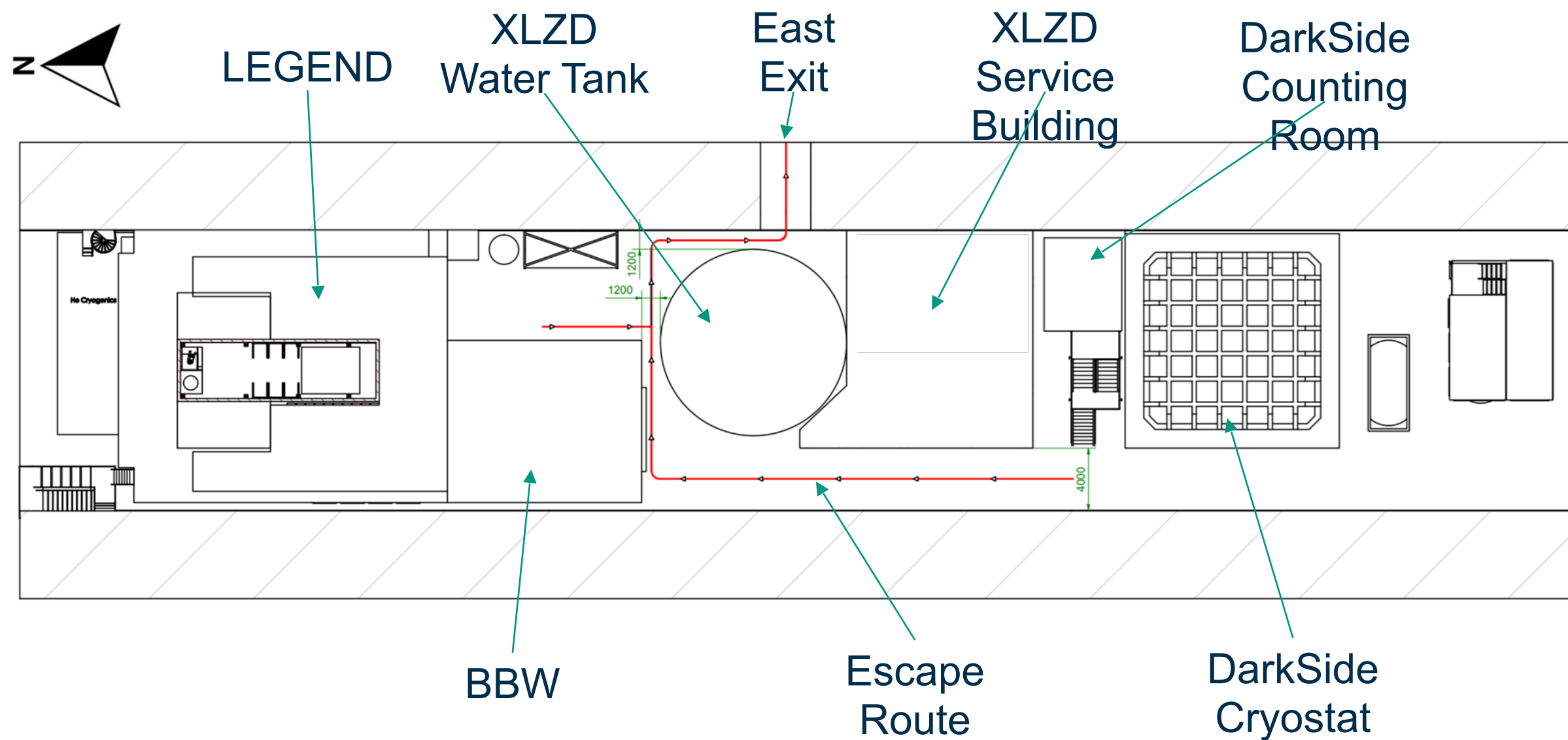
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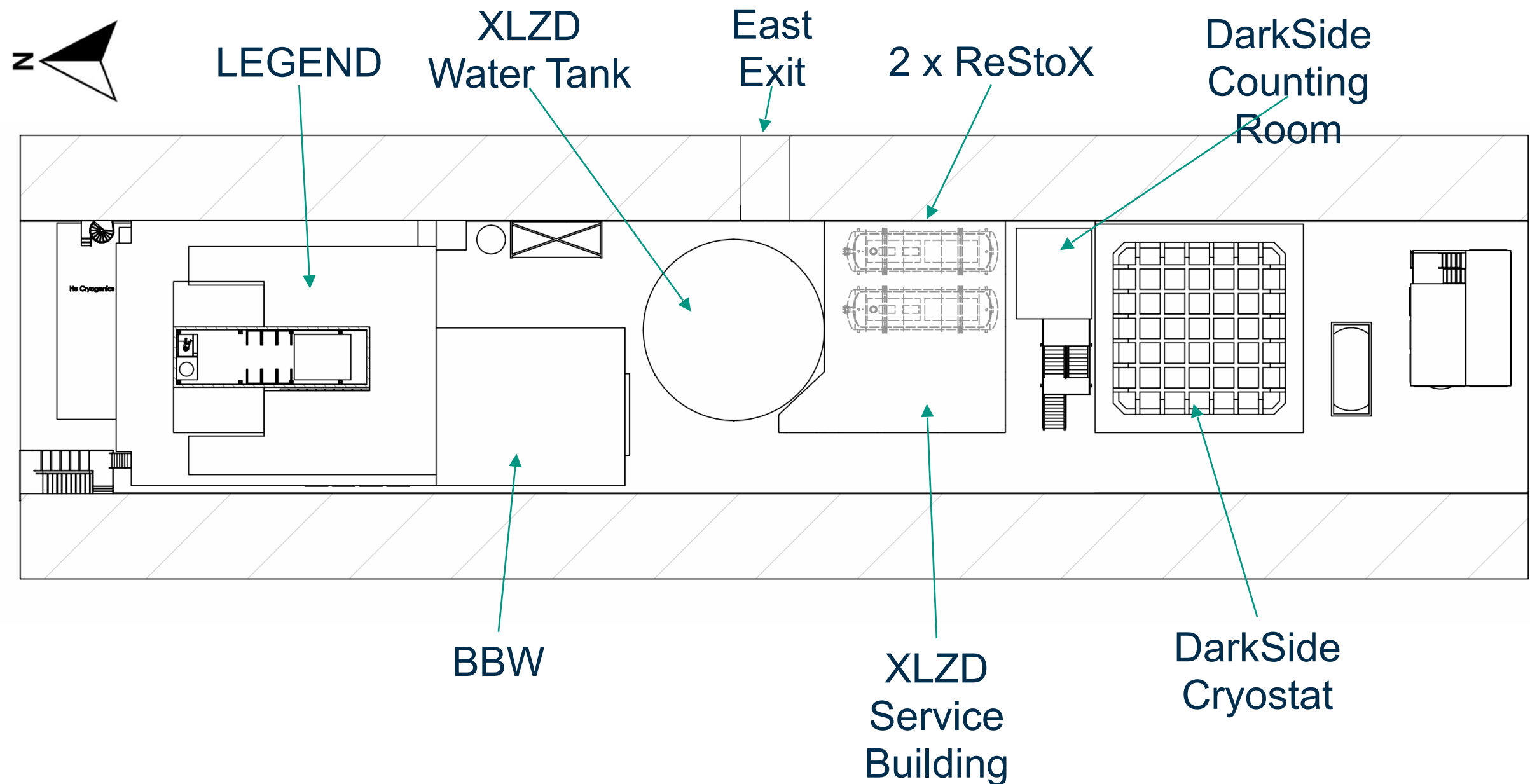
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XLZD in Hall C @LNGS

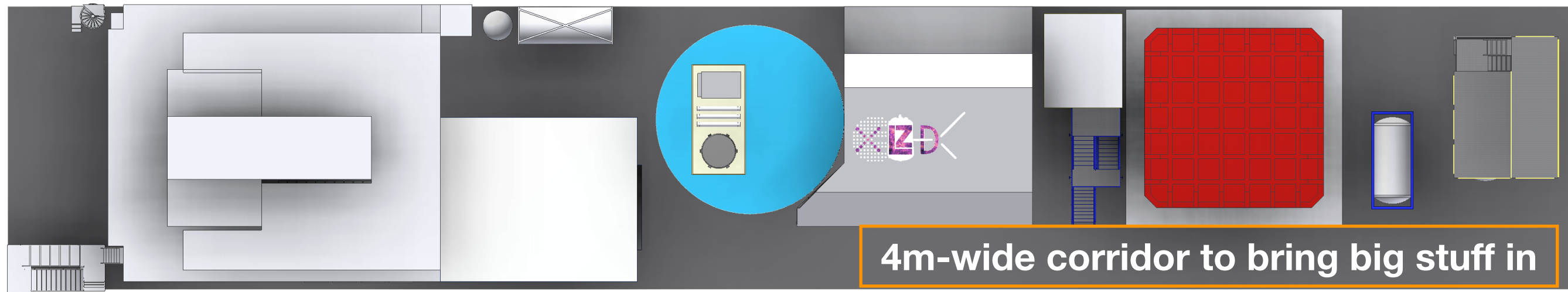


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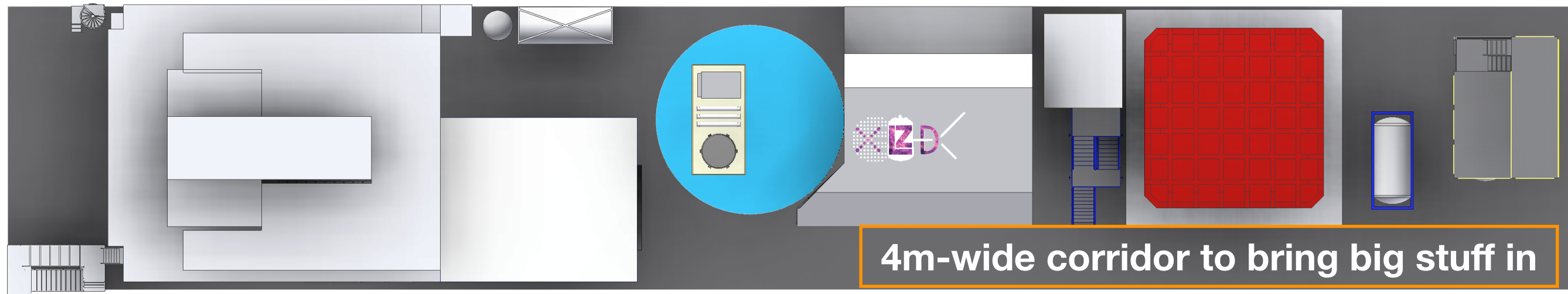
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XLZD WT and Service Building

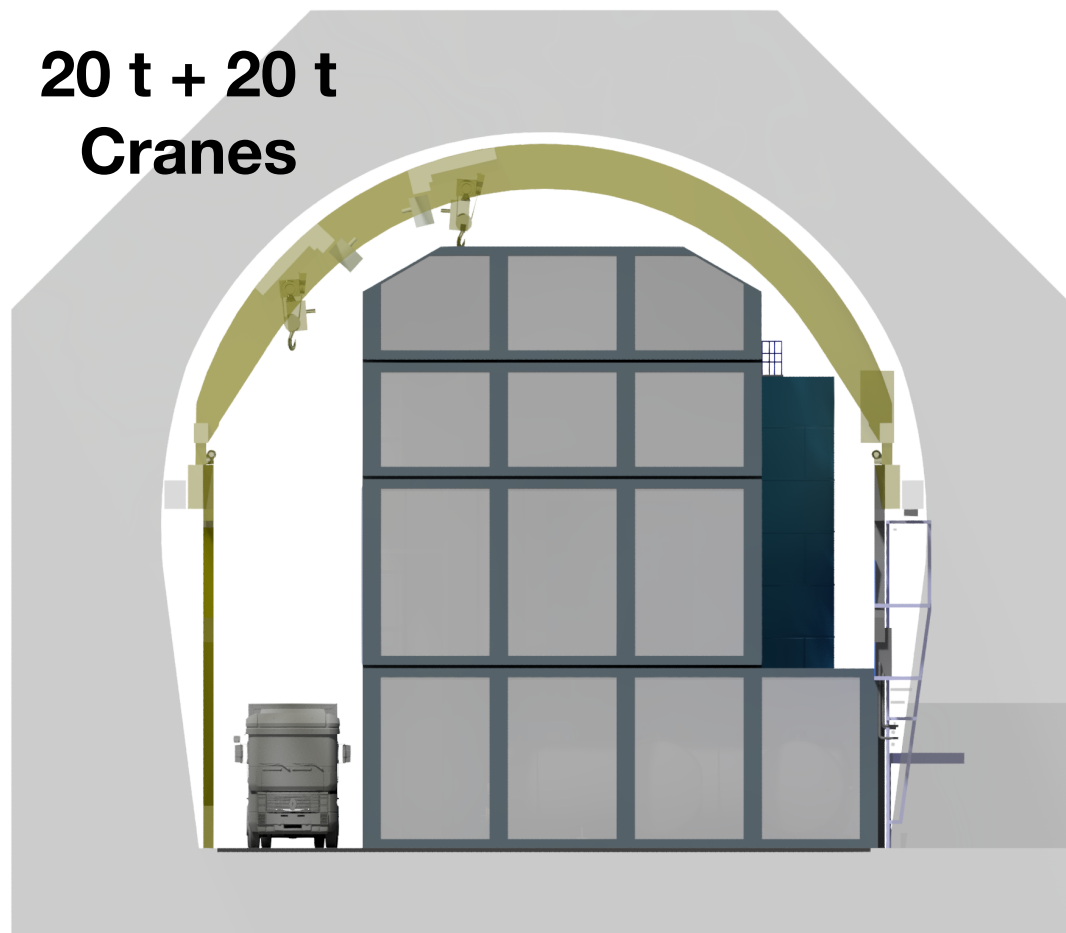


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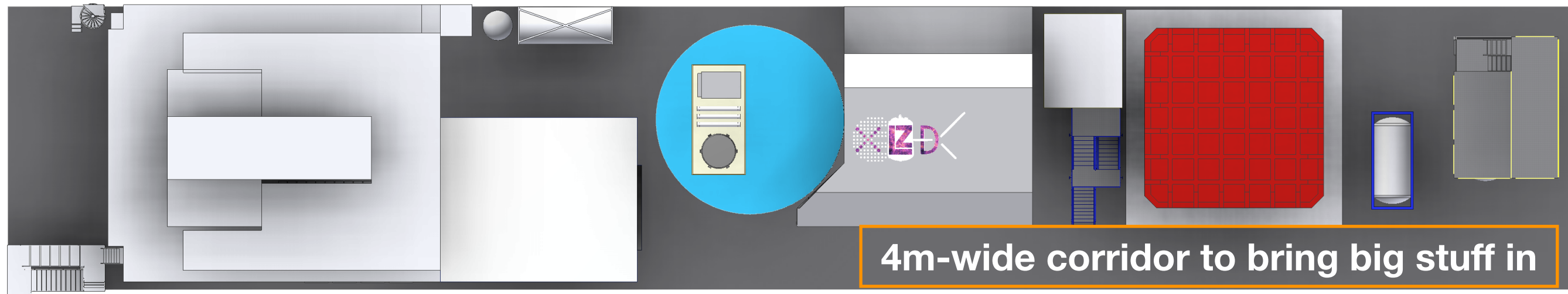
20 t + 20 t
Cranes



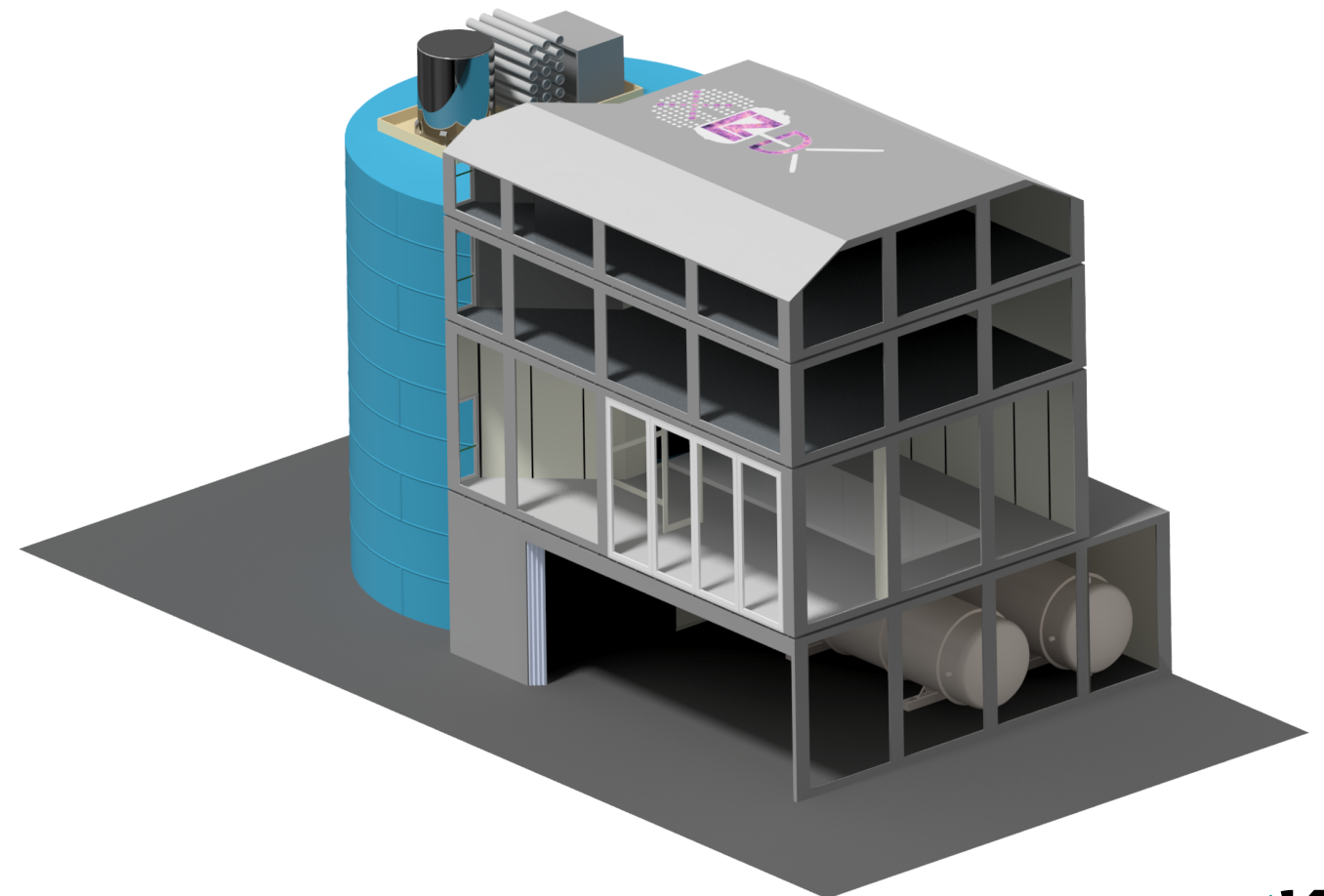
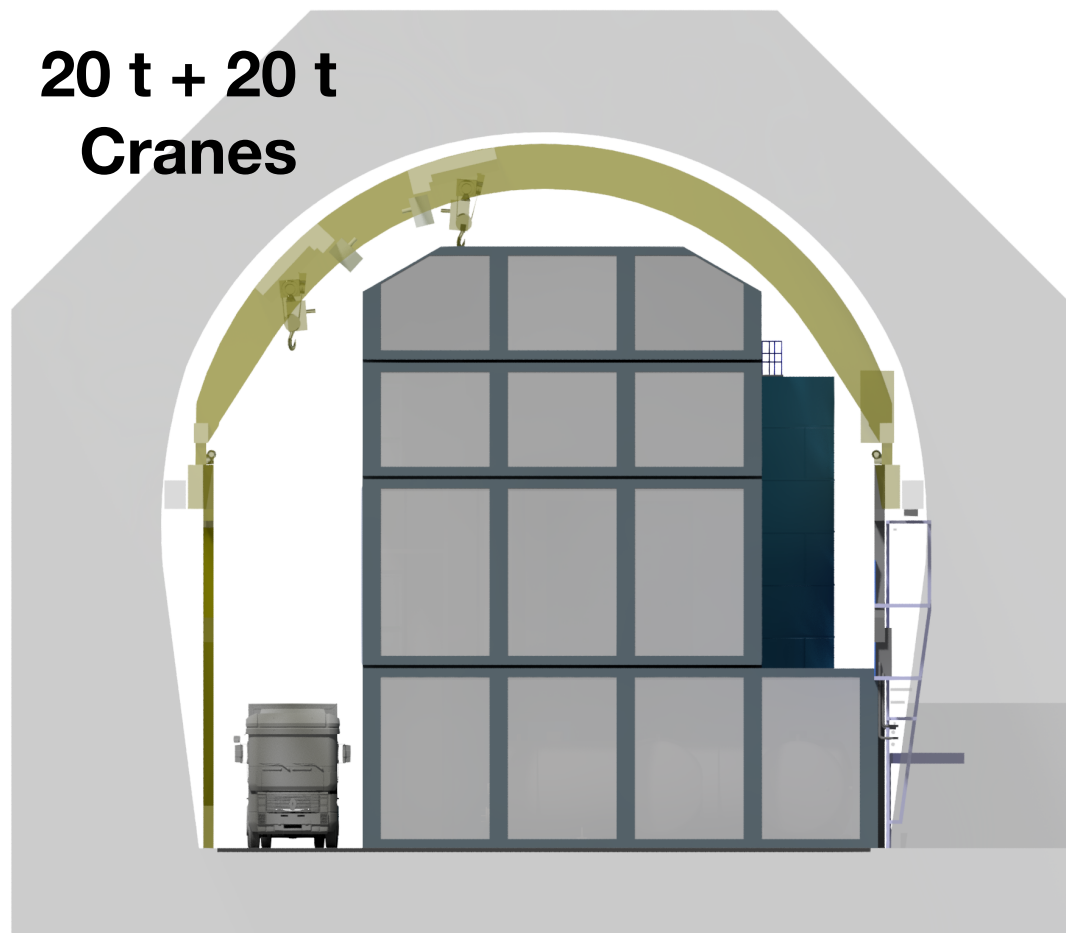
By A. Schwenk 

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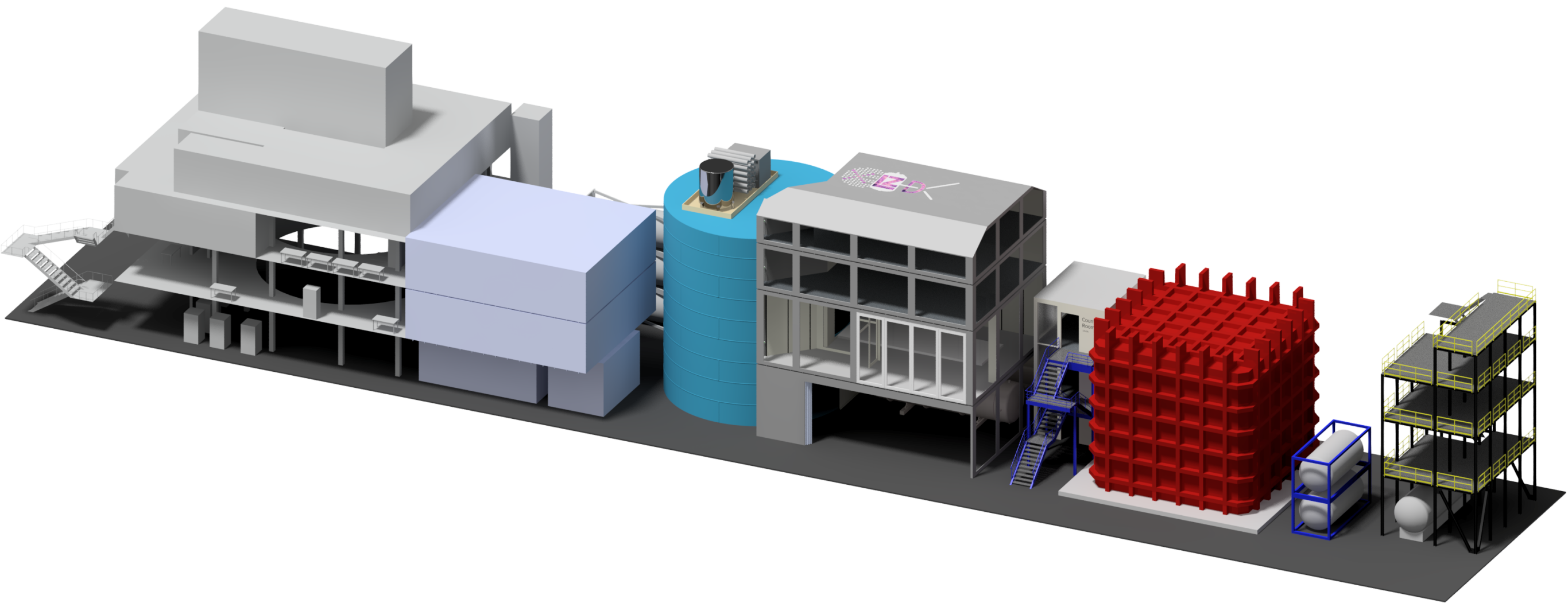


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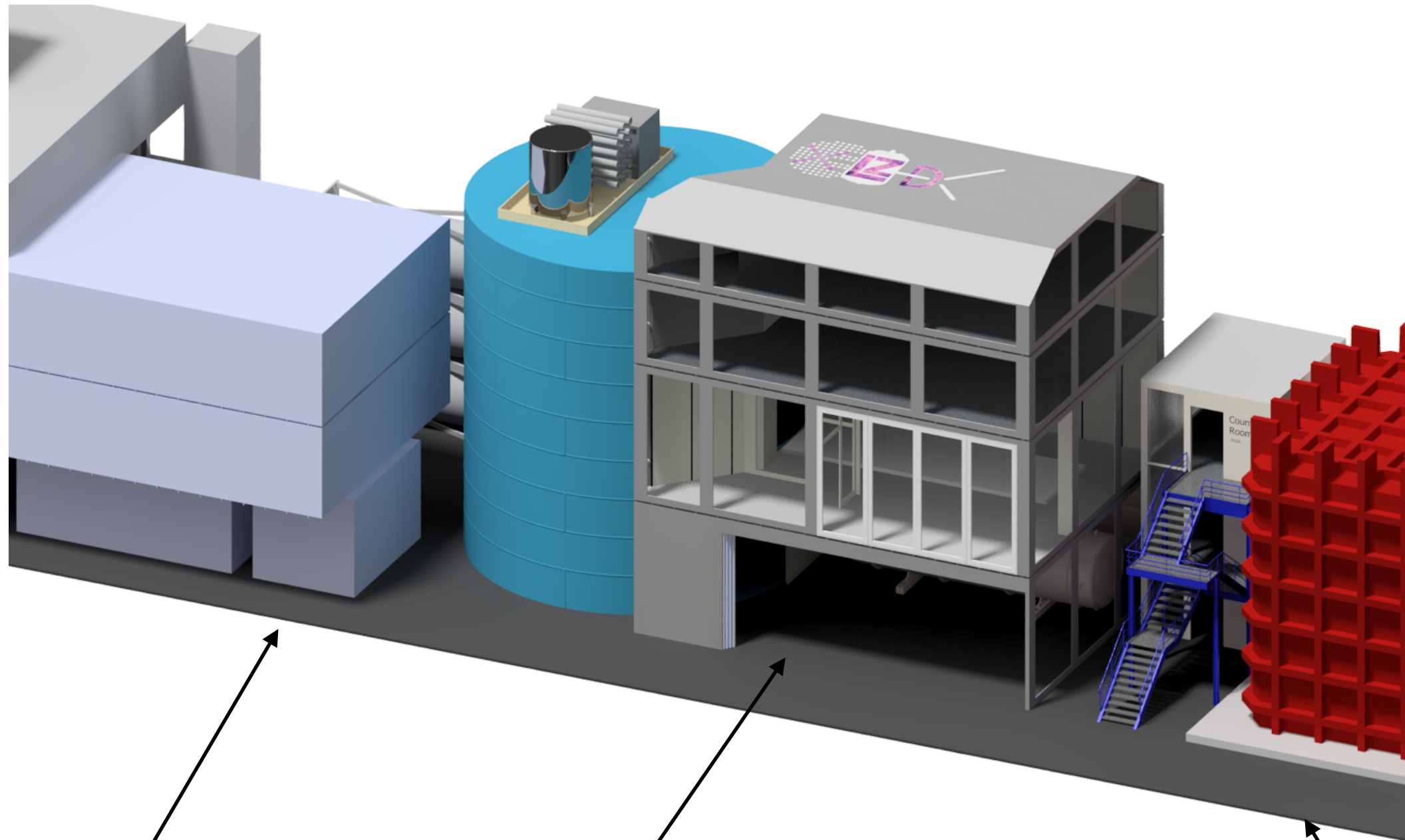
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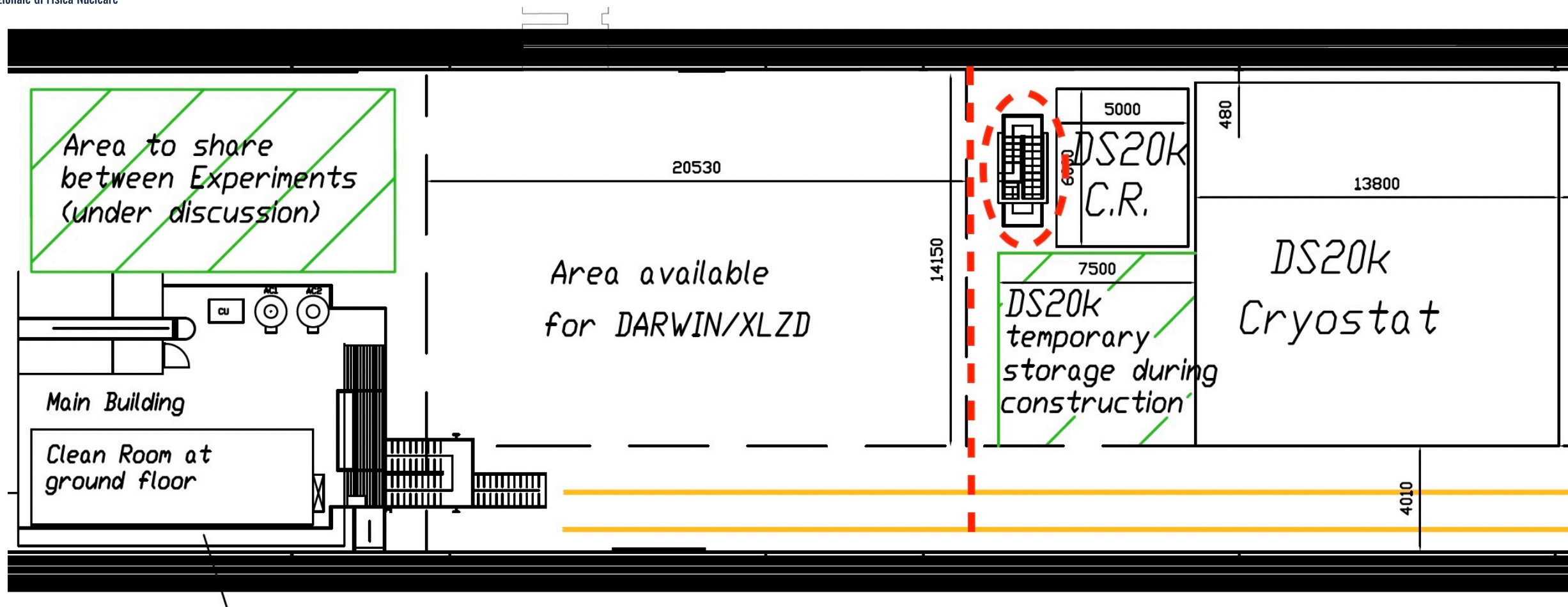
**Rn-reduced air plant
 $O(100-10 \text{ mBq/m}^3)$**

**Clean room
at ground floor or upper
(TPC assembly)**

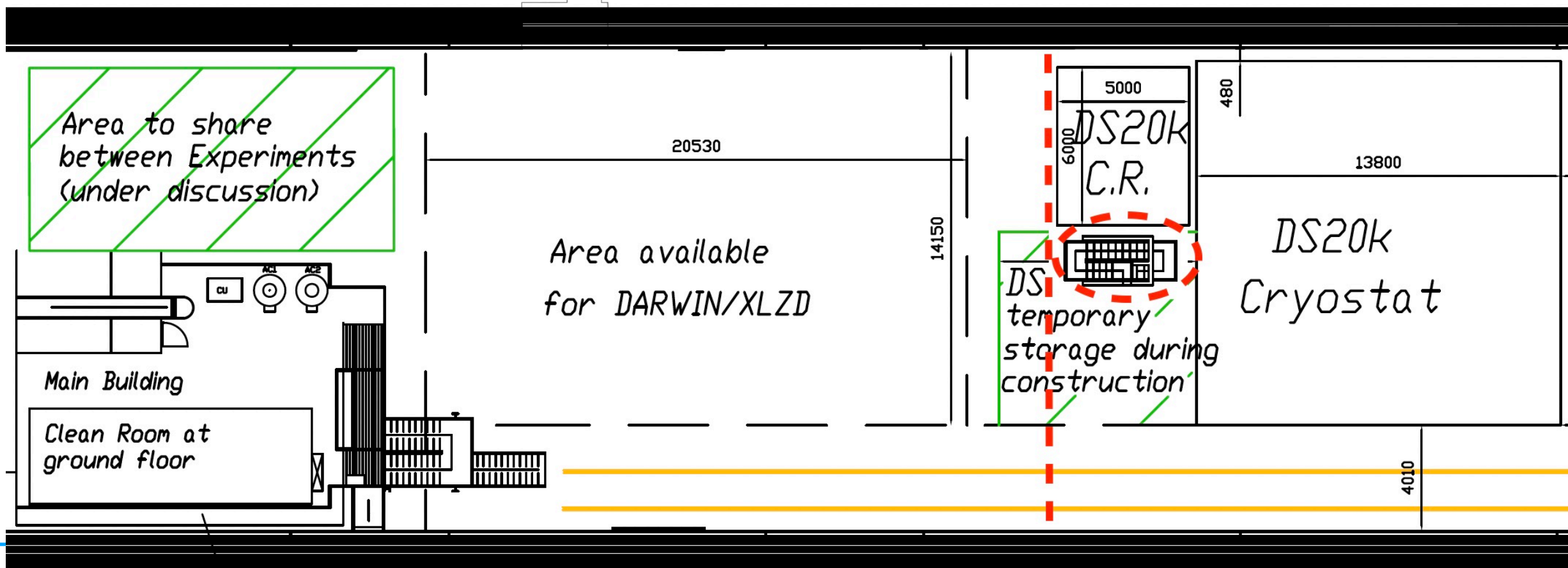
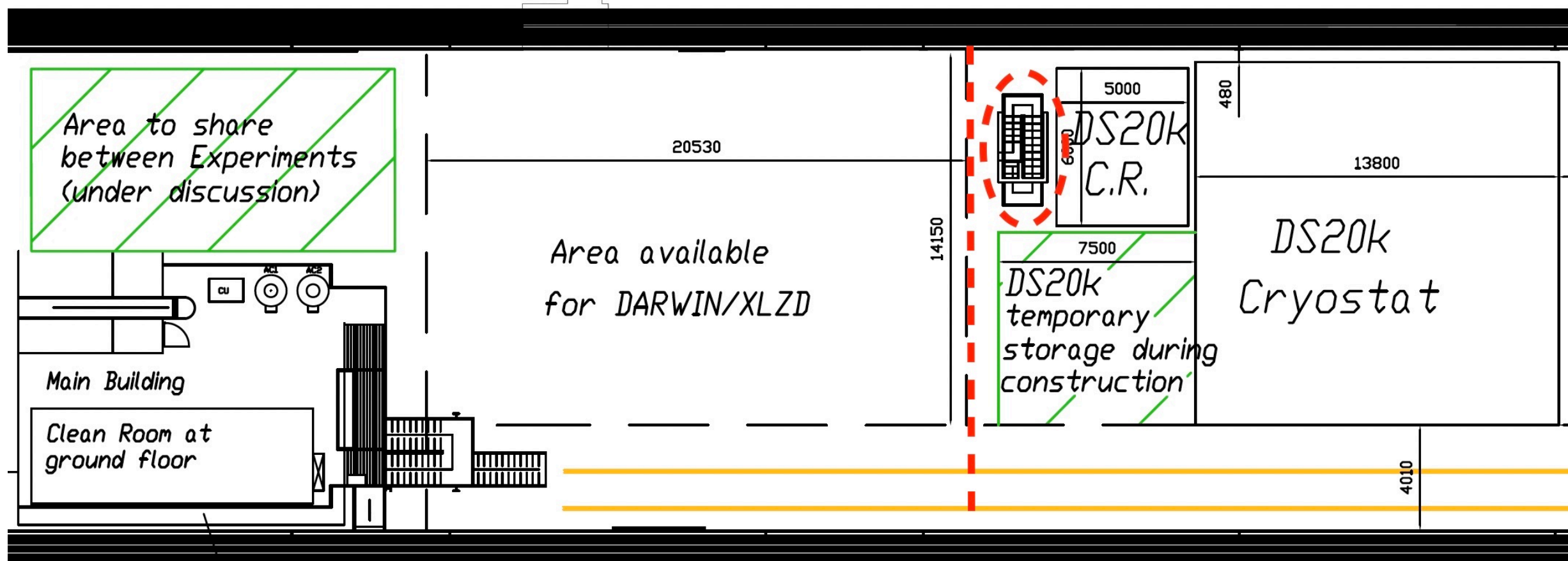
**4m-wide corridor to bring
big stuff in**

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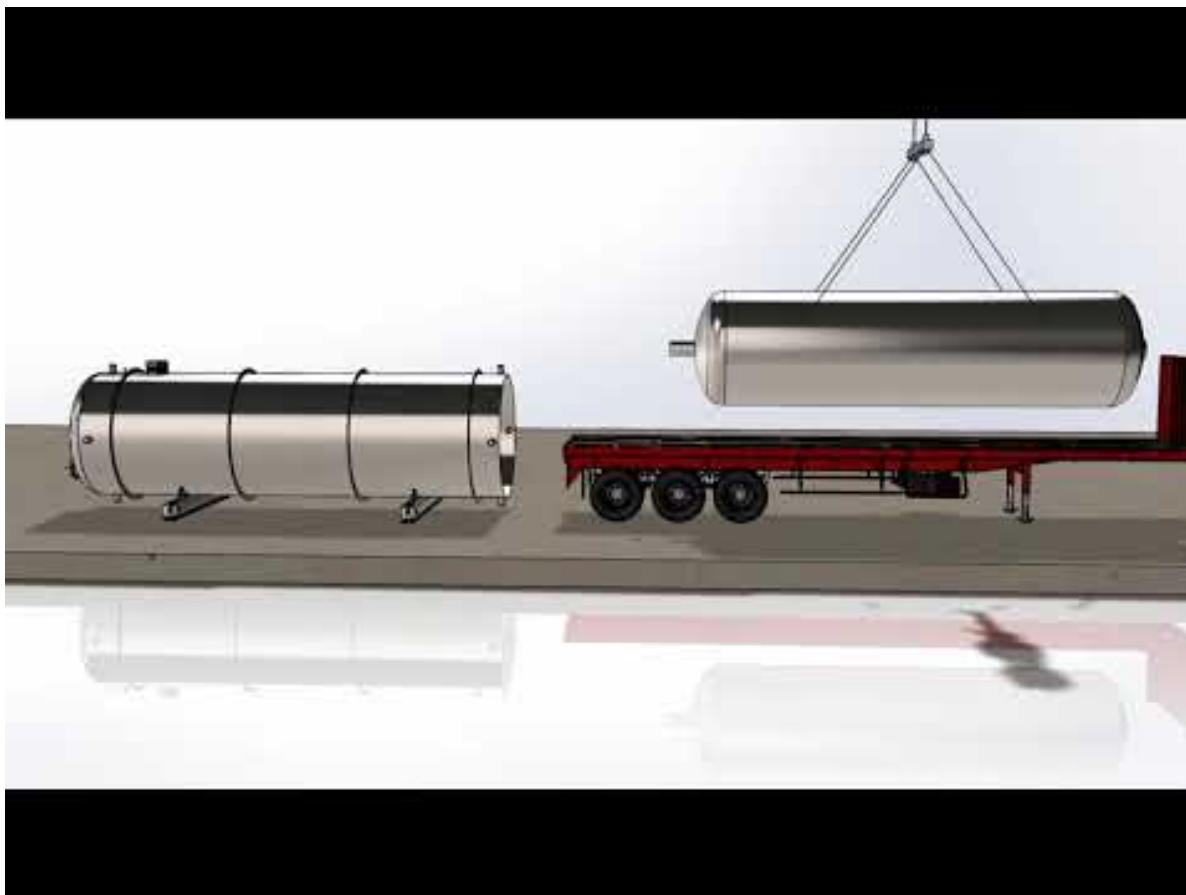
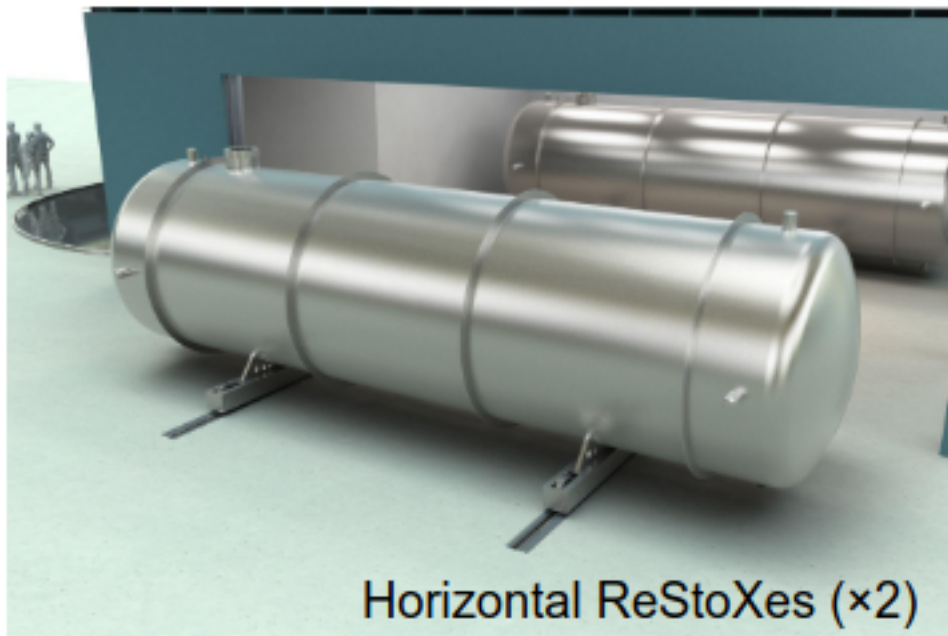


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Installation of Restox at the ground floor of the building: two big “beasts”, 40 t each

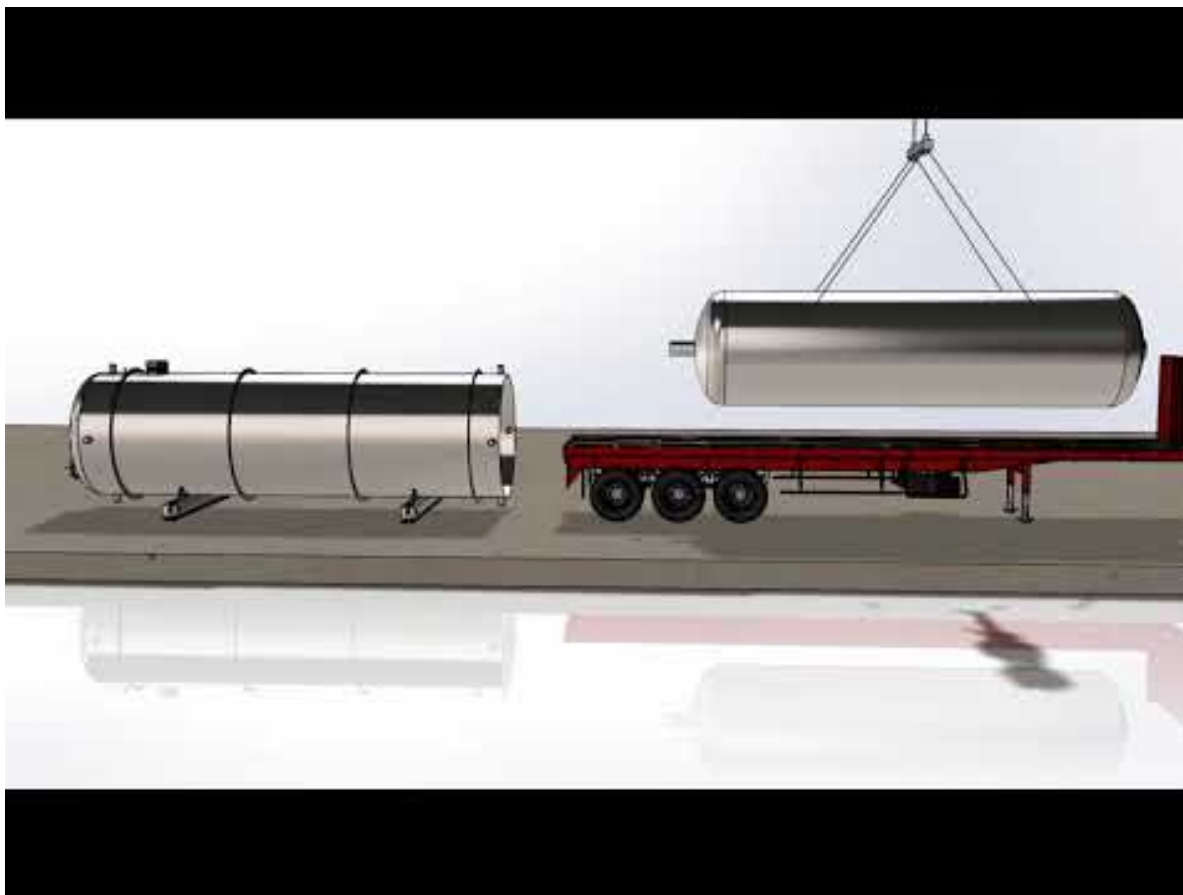
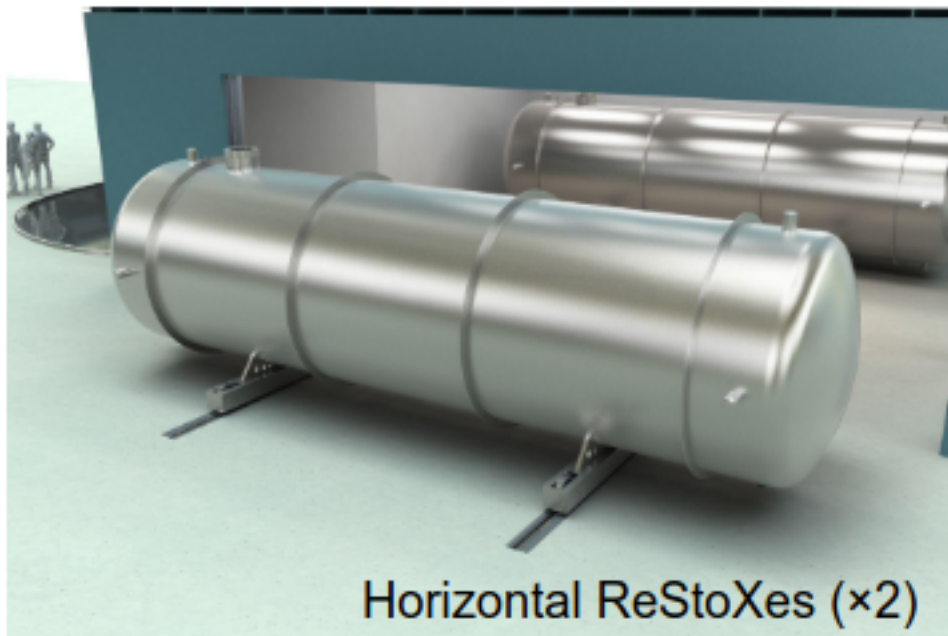


<https://youtu.be/eSbllC2toWA?si=N3icn7poa3oxuch->

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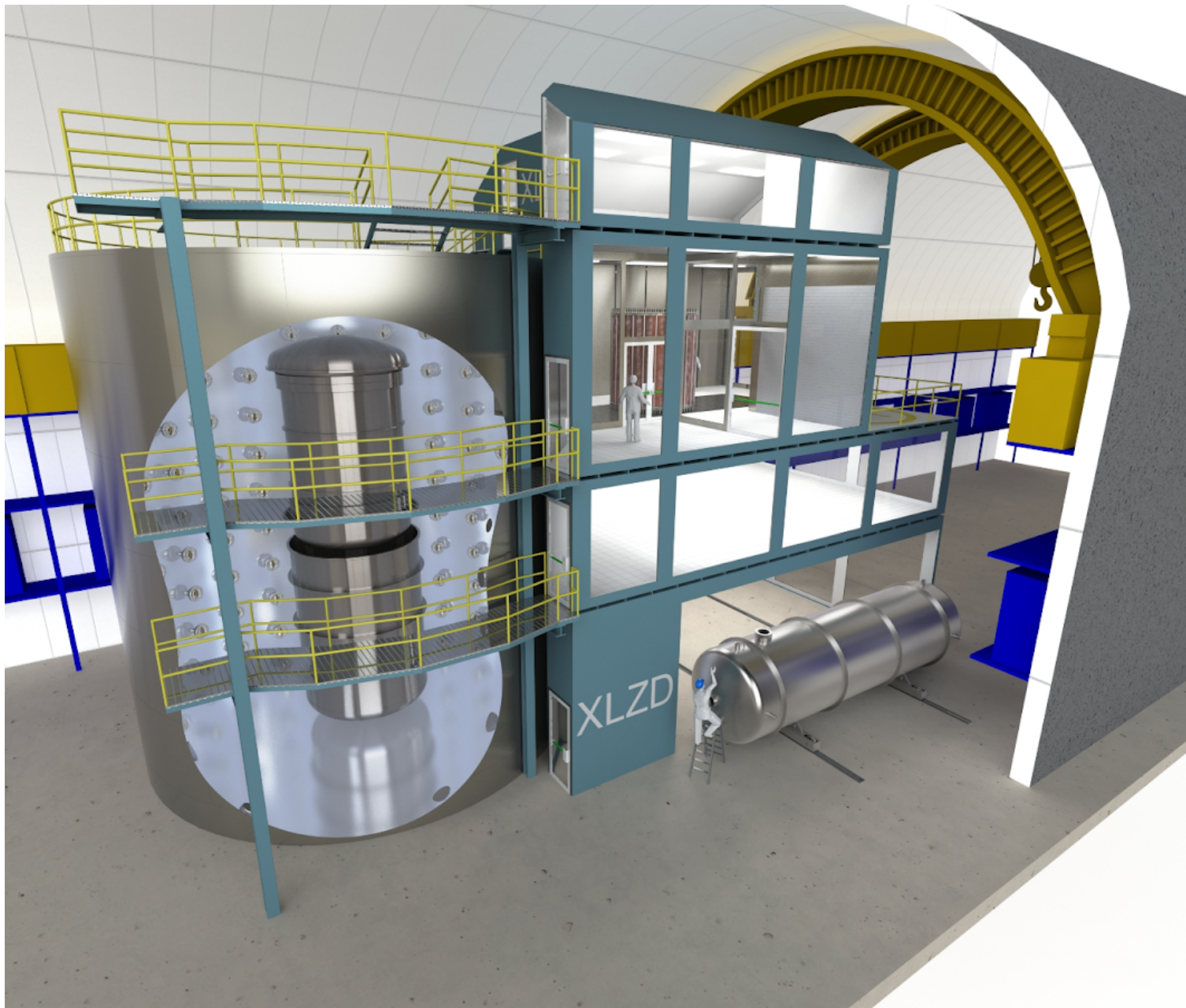


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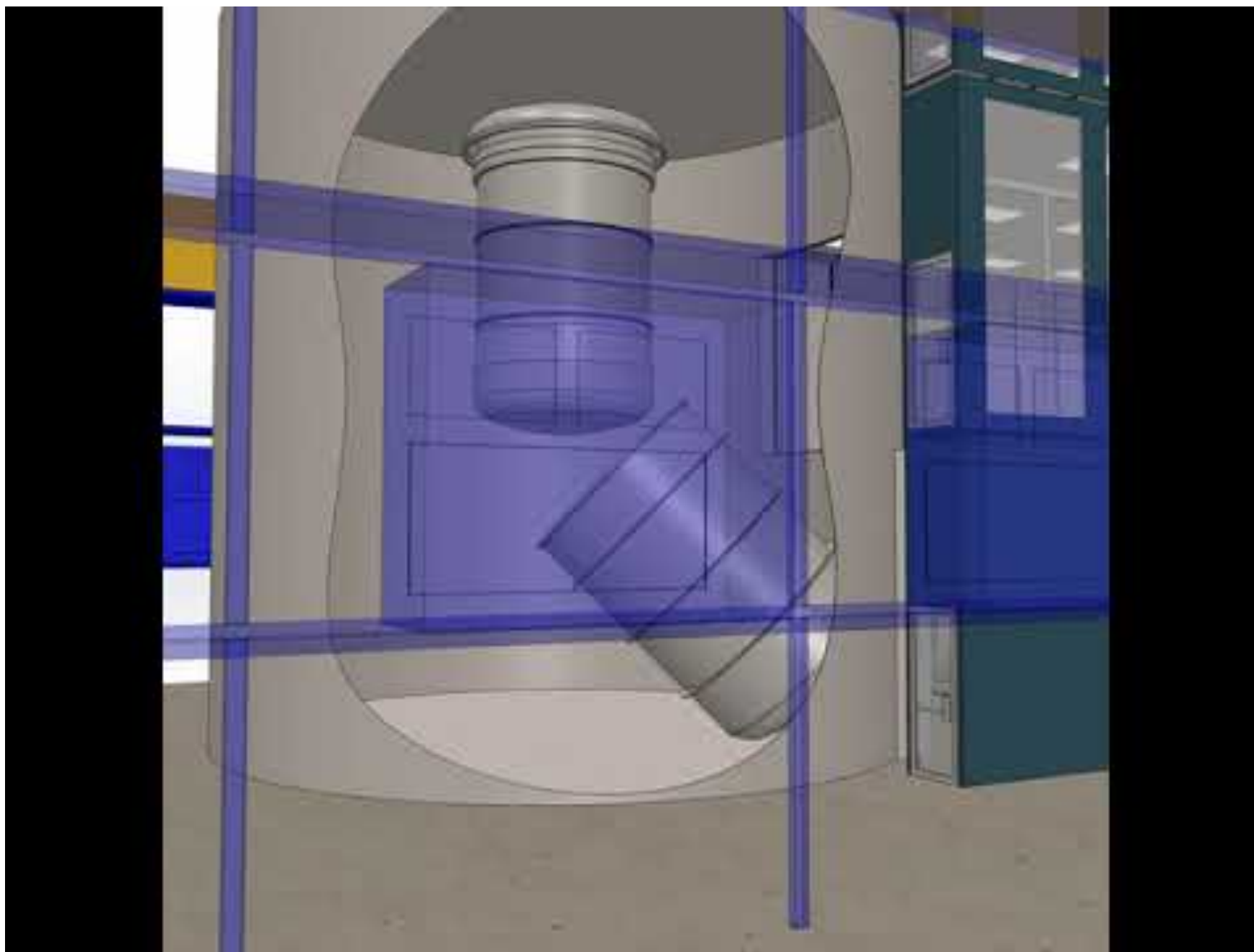
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Installation of the Cryostat inside the Water Tank

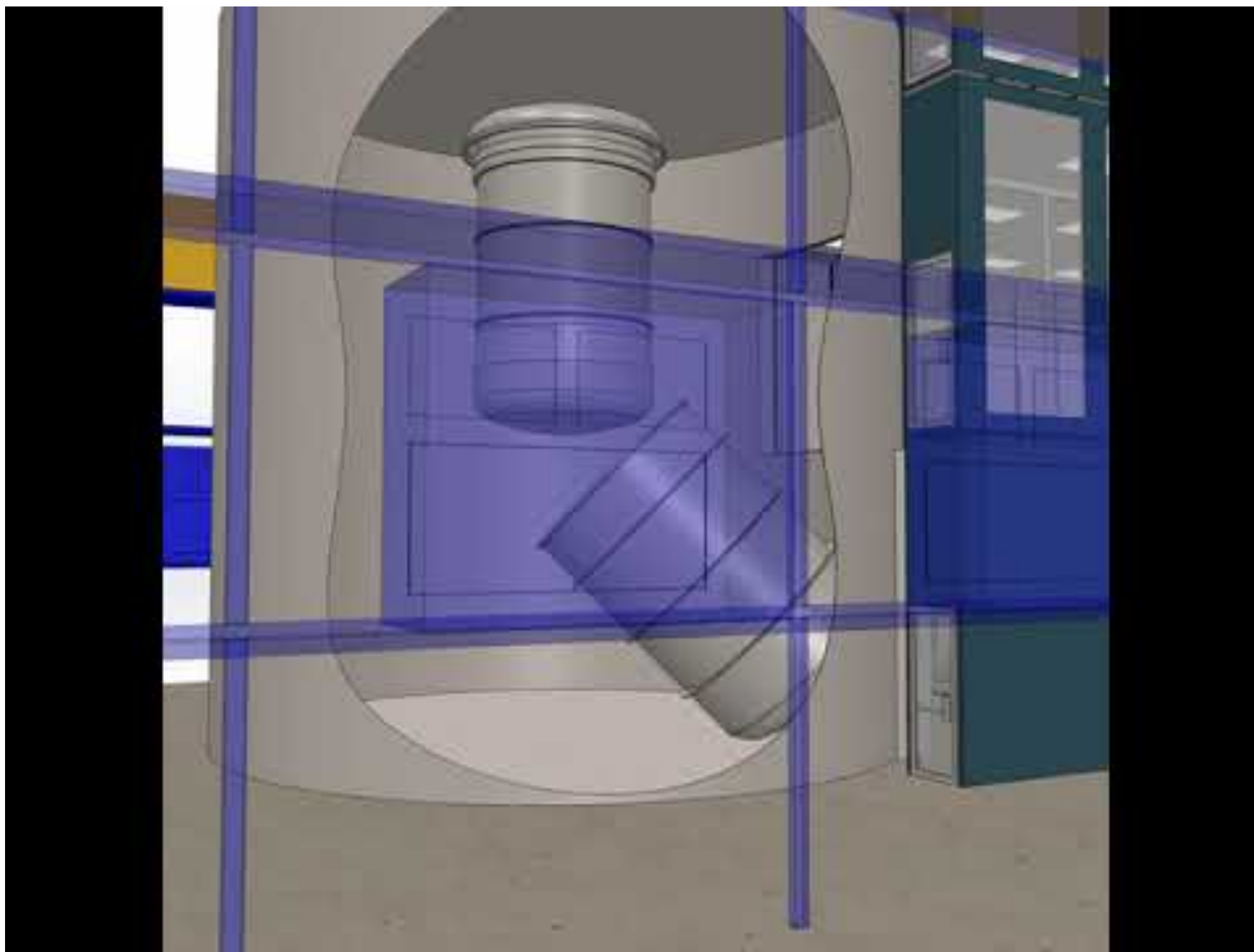


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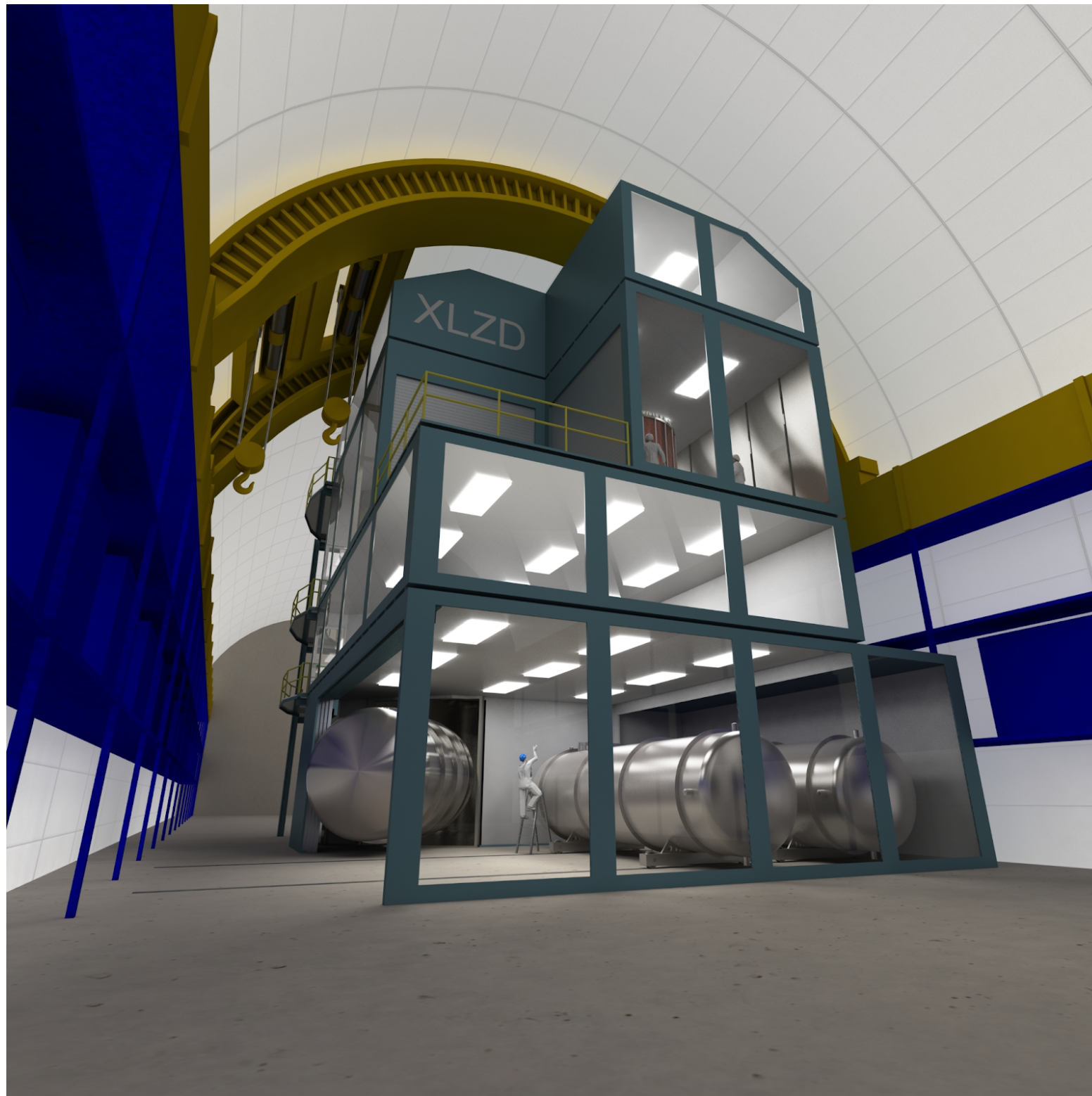


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- Screening facilities, mechanical workshop, chemical lab, + other standard LNGS services

External Buildings



Mounting Hall



Large Clean Room in the Mounting Hall
Where the XENONnT TPC has been built



FIELD CAGE ASSEMBLY

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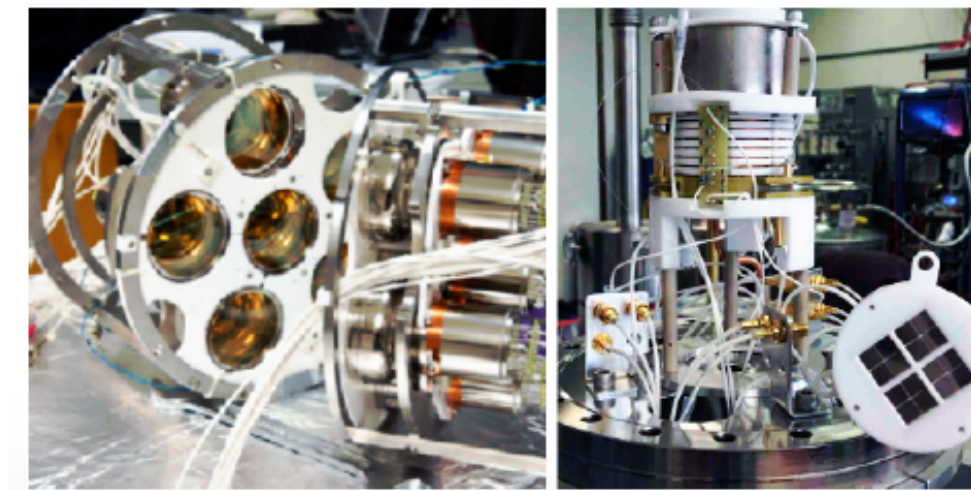
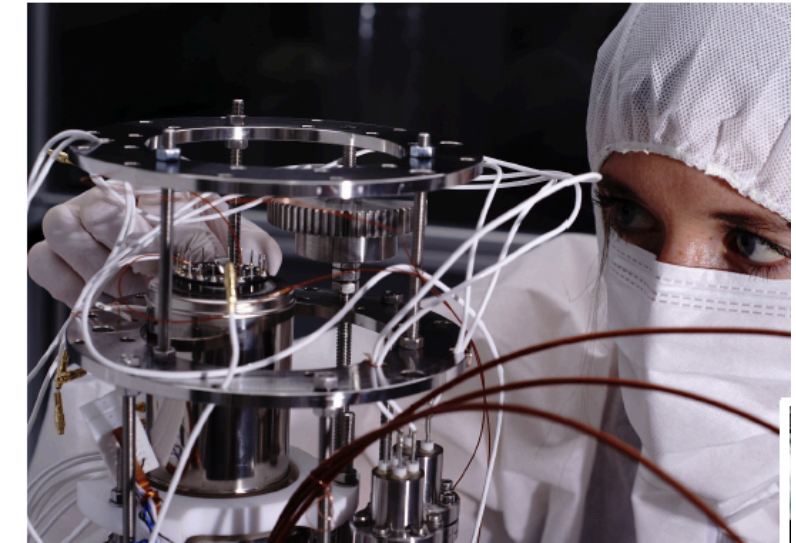
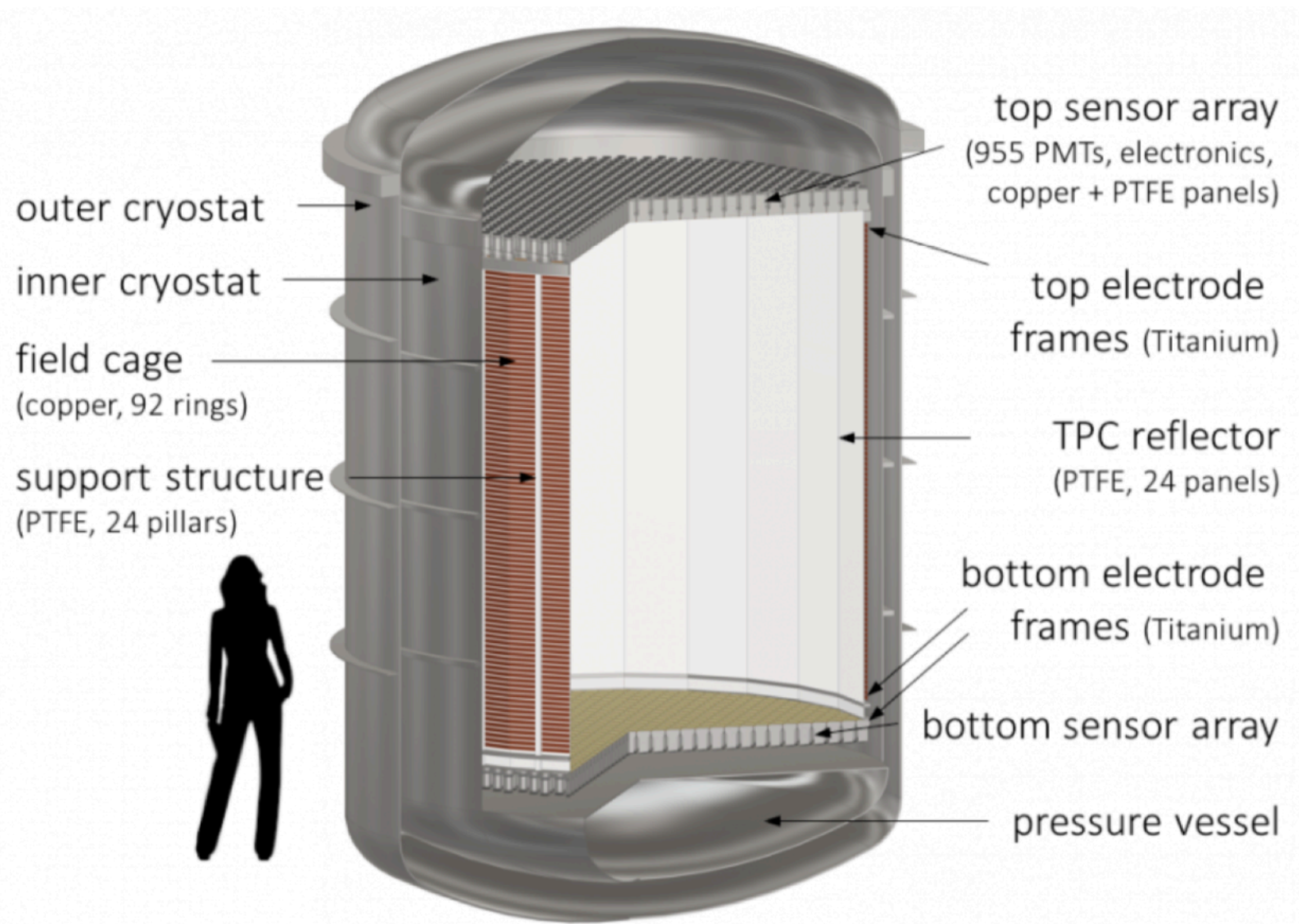
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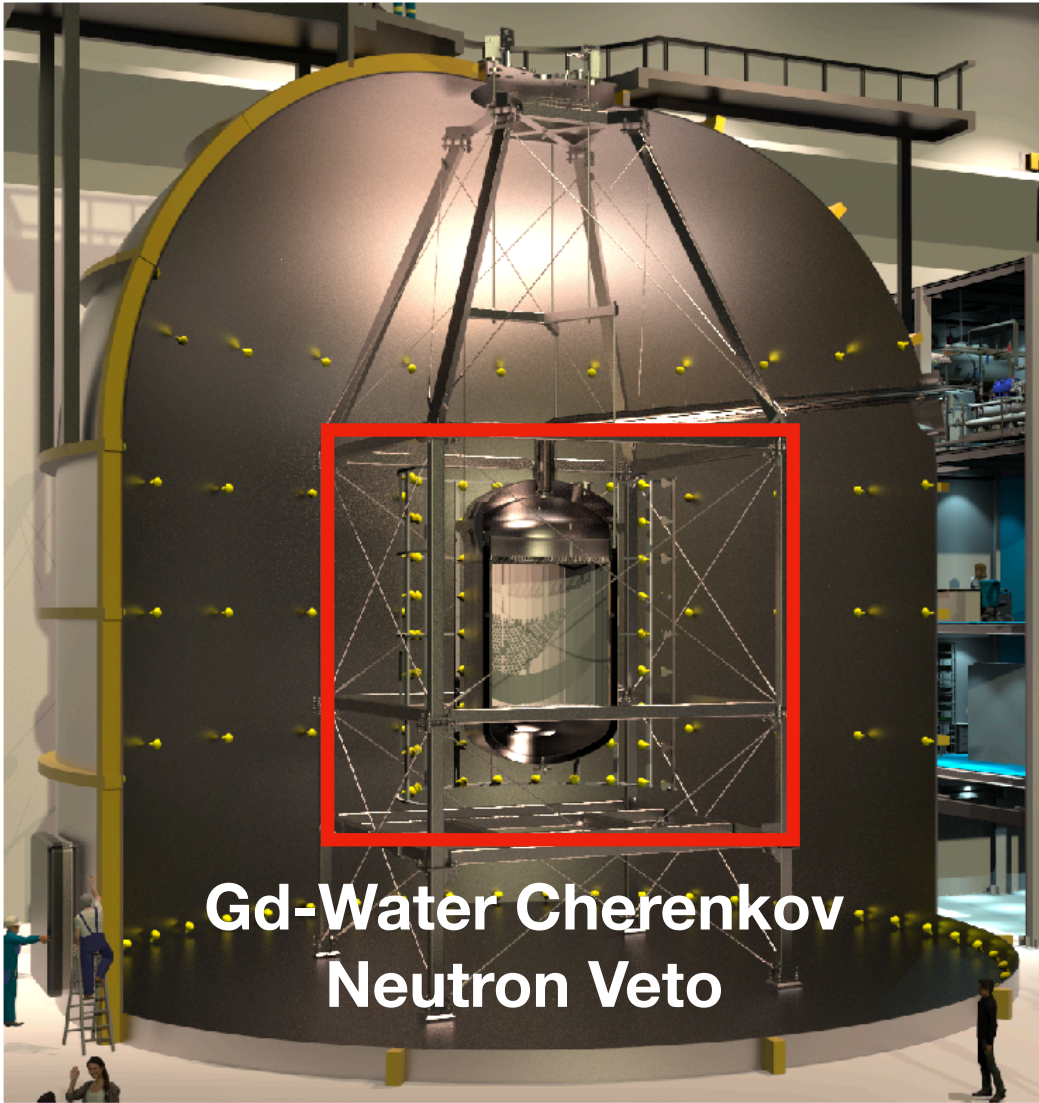
XLZD: R&D of INFN groups

ongoing R&D on photosensors, electrodes and cold electronics



- Baseline design for a large **liquid xenon** dark matter detector
- TPC of about 3 m \varnothing & 3 m drift length
- 75 t **Xe** total mass (60 t inside the TPC)
- Decrease the Rn content by (another) factor 10

XLZD: R&D of INFN groups



Water Tank	R (m)	H (m)	Volume (m3)	GdSO mass* (t)
XENON	4.6	10.2	700	3.5
XLZD	6	12	1360	7

n Veto	R (m)	H (m)	Volume (m3)	GdSO mass* (t)
XENON	2	3.2	33	/
XLZD	3	6	120#	0.6



*
* Considering an
hermetic nVeto