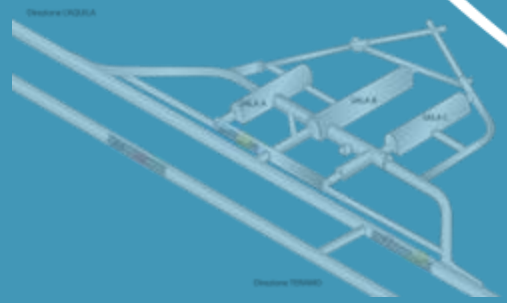
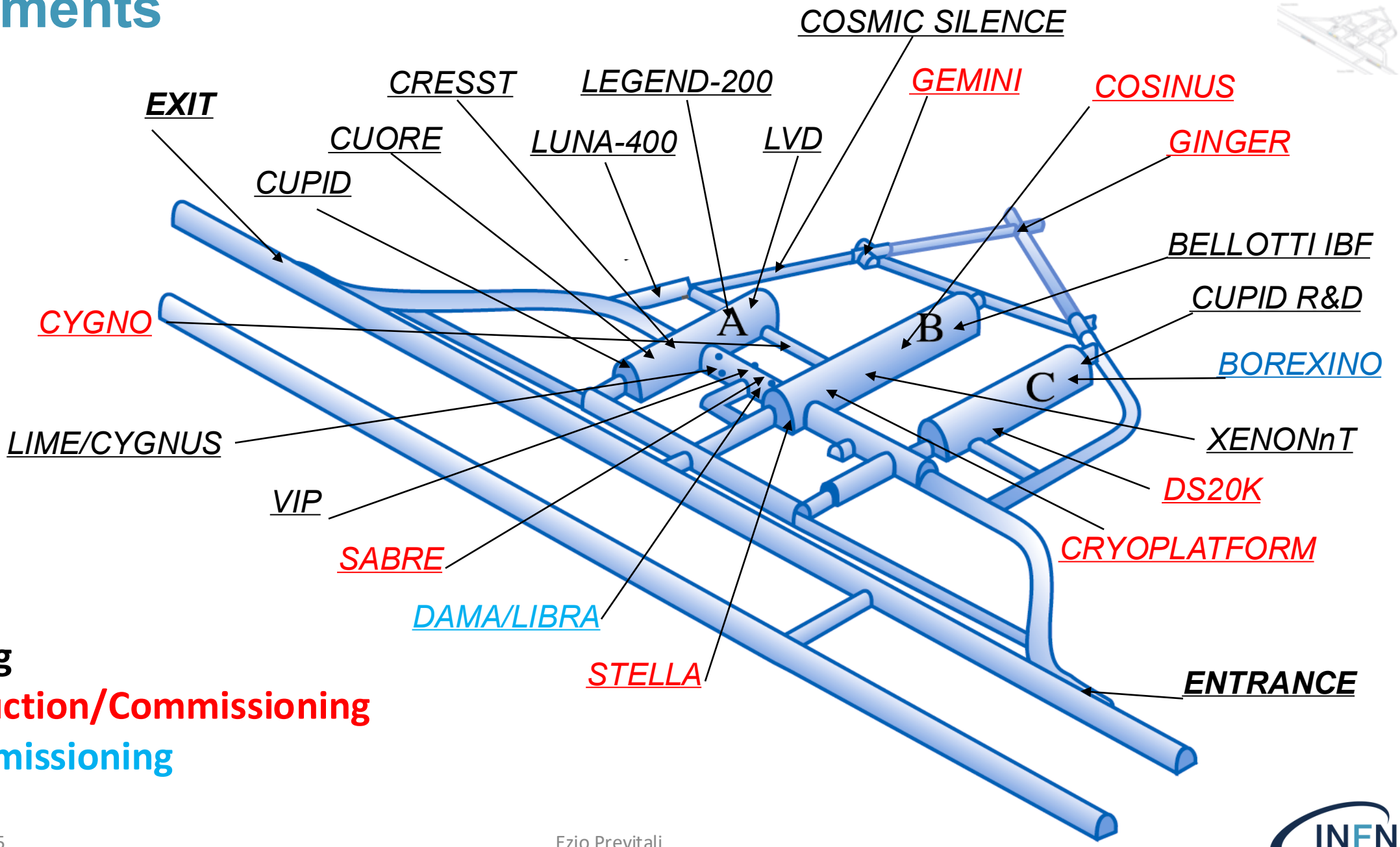
Gran Sasso National Laboratory



Ezio Previtali - LNGS

XLZD Collaboration Meeting

Experiments



- **Running**
- **Construction/Commissioning**
- **Decommissioning**

International Community @ LNGS

During the 2024
Registered LNGS users

Total:	650	(~1334*)
Italian:	359	(~482*)
Foreign:	291	(~852*)

*** Total scientists involved in LNGS research**

LNGS People

128 staff personnel

- Researchers: **15**
- Engineers: **41**
- Technical : **44**

14 post doc

Direct connection with LNGS for associated members:

- University of L'Aquila
- Gran Sasso Science Institutes (doctorate school)

LNGS involved people: **260**
(128 staff + 132 associated)

On going activities

Replacement lightining system

Cryoplatform Facility -> Building phase

CYGNO -> Building phase

Helium Liquiefier -> Major Upgrade phase

DAMA -> Decommissioning phase

BOREXINO -> Decommissionig phase

DS-20k -> Building phase

Water mist fire protection system Installation

LNGS Technical Infrastructure

Electrical System

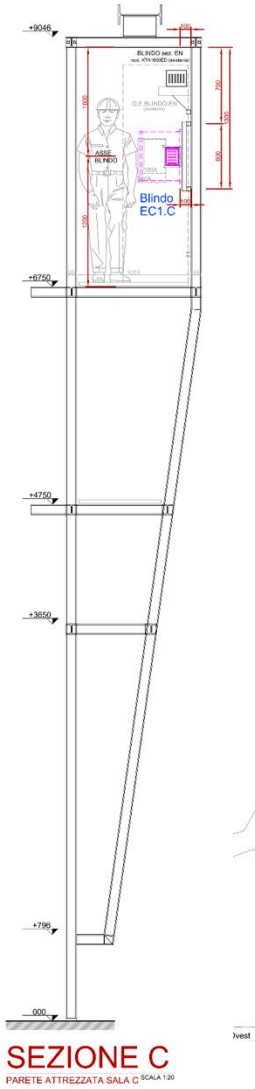
- Installed **power 2 MW for each side (AQ-TE)**
- **28 UPSs** (10 to 300 kVA)
- **6 Diesel generators** (250 to 1500 kVA)

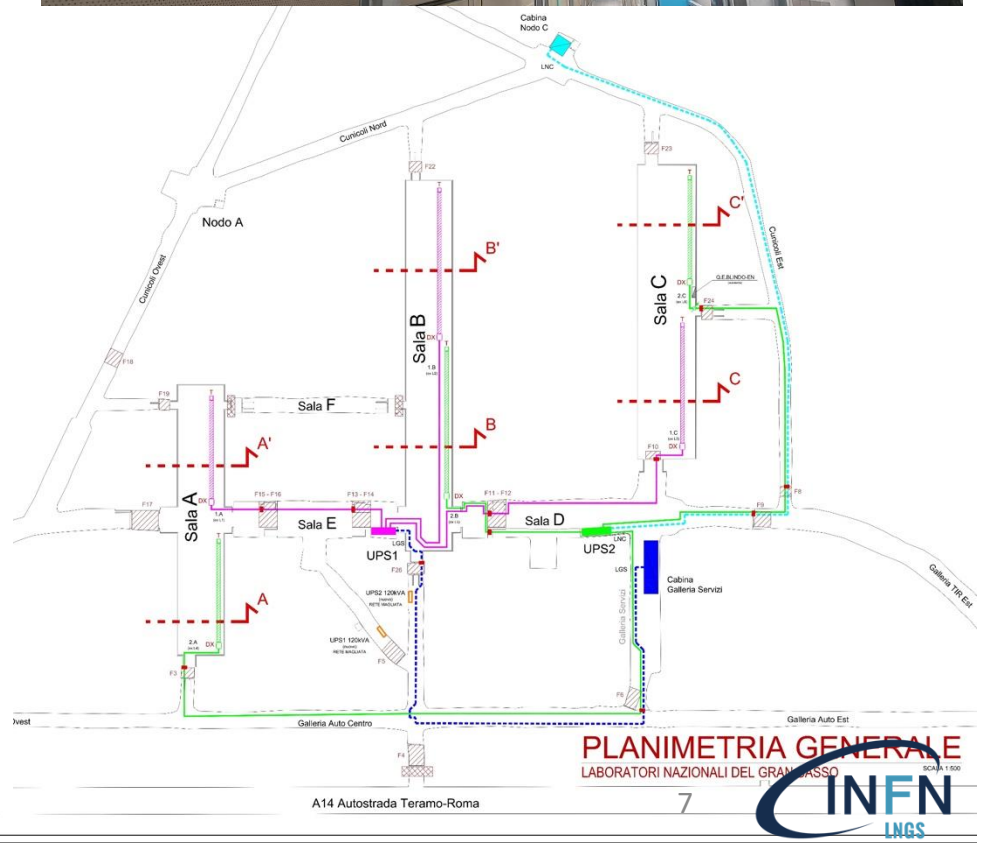
- 20 kV (MV) power supply to underground Lab
- New Transformers in the Underground
- **Power supply** of the underground **from both sides** (Teramo and L'Aquila)

LNGS Technical Infrastructure

Normal and UPS Power Upgrade

- New **UPS distribution**, by means **busbars**,
- Connected to centralized redundant modular UPSs
- Underground **Total UPS power: 540 kW**
- **Redundant power** supply for experiments
- Installation of a new Power Control Center





LNGS Technical Infrastructure

Cooling System

Total **power** cooling **1.1 MW**

Primary circuit **flow rate 90 l/s***

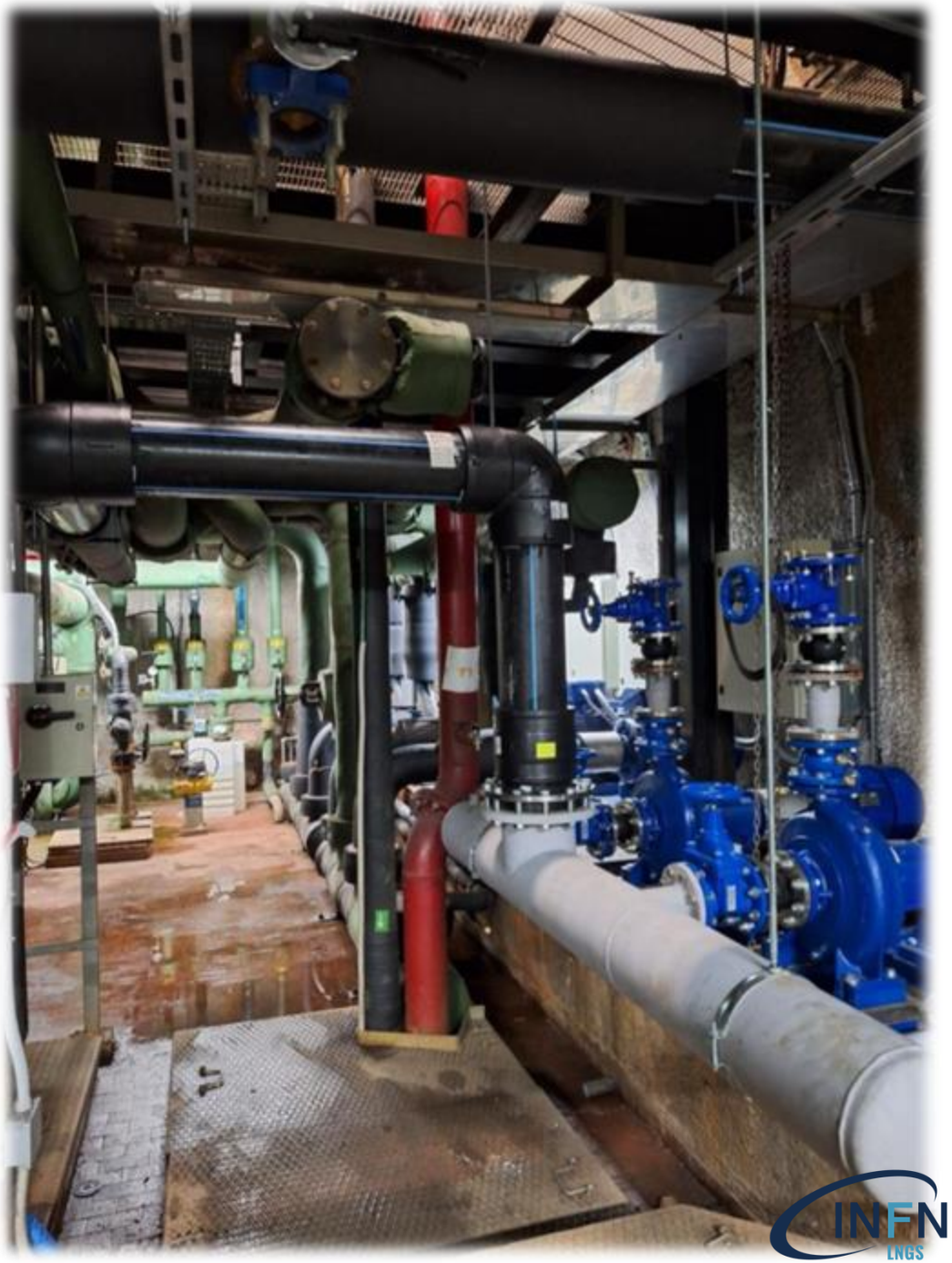
Secondary circuit **flow rate ~20 l/s**

Water **temperature** in secondary circuit **9-12 °C**

Redundancy of the circulating pumps

*Power cooling limit:

(Water Flow Rate) * (C_{H2O})*(3 °C)



LNGS Technical Infrastructure

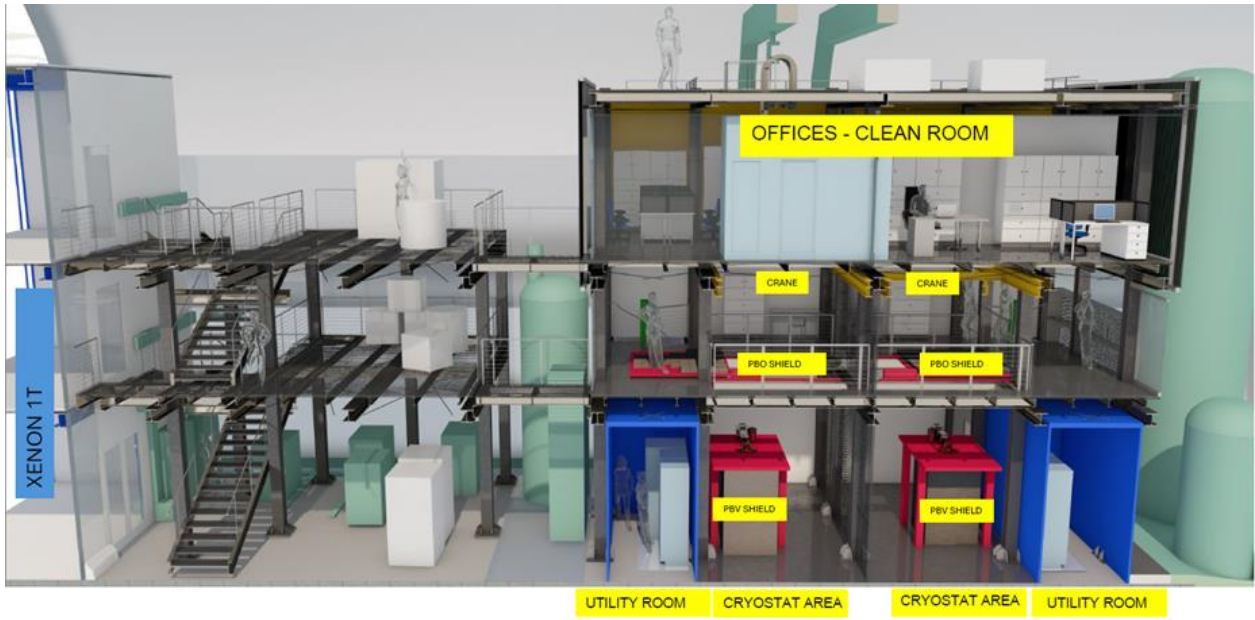
Ventilation System

- Two air cabinet each side of highway tunnel
- Each cabin for air **inlet and extraction**
- Air distribution carried out by **4 UTA**
- Air flow increased from 60.000 to **80.000 m³/h**
- Connection to the Underground Laboratories partially new by **1.5 m ducts diameter**

LNGS-Future - Cryogenics

CryoPlatform – Hall B

New cryogenic laboratory to **low temperature** test detectors and sensors for cryogenic applications.



Helium Liquefier – Truck tunnel (B – C)

New LHe plant with a capacity of **20 l/h**

Nitrogen Liquefier – Truck tunnel (B – C)

New LN plant with cryogenic power of **50 kW @ 77k**

STELLA in Hall B

STELLA: **S**ub **TE**rranean **L**ow **L**evel **A**ssay

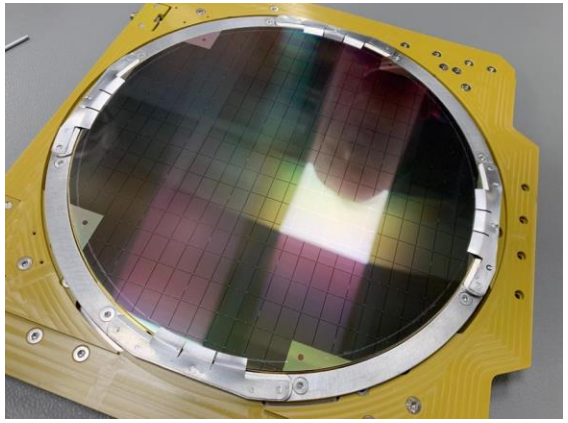
- Building completed end of 2024
- HPGe moved from Low Activity to STELLA
- Full commissioning middle of 2025
- New very low background HPGe will be operated

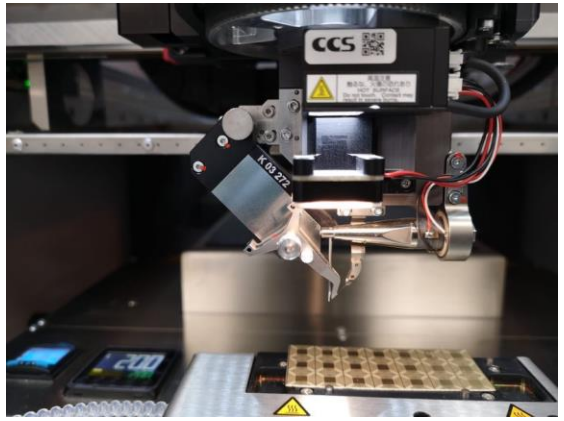
NOA - Nuova Officina Assergi

End 2022: NOA ready to start the SiPM production for DS20k
February 2023: DS collaboration begin a massive test of SiPM

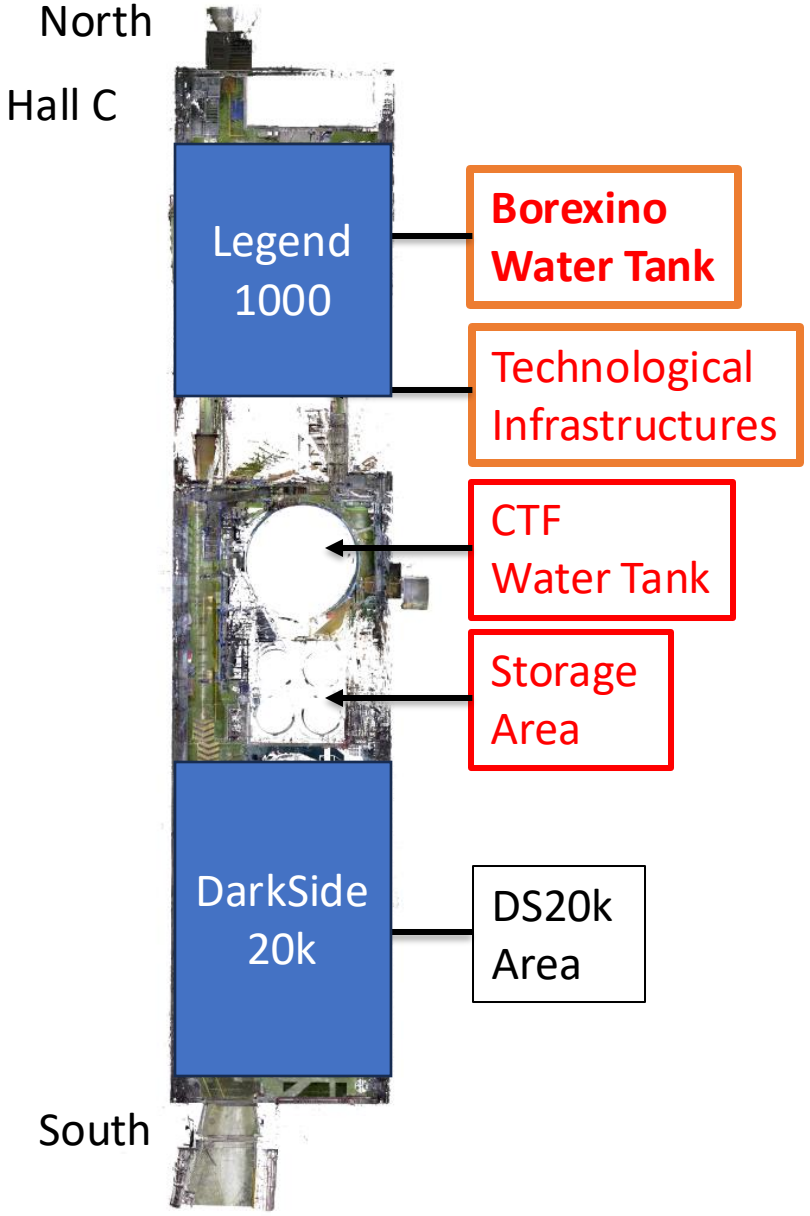
NOA stably operates on Si devices

NOA facility will be available soon for future requests





Reconfiguration of Hall C



The dismount program for Borexino area ready to start in Autumn

- Dismount activities will be organized to minimize interferences
- Reconfiguration of safety infrastructures
- Complete dismounting completed before the end of 2026

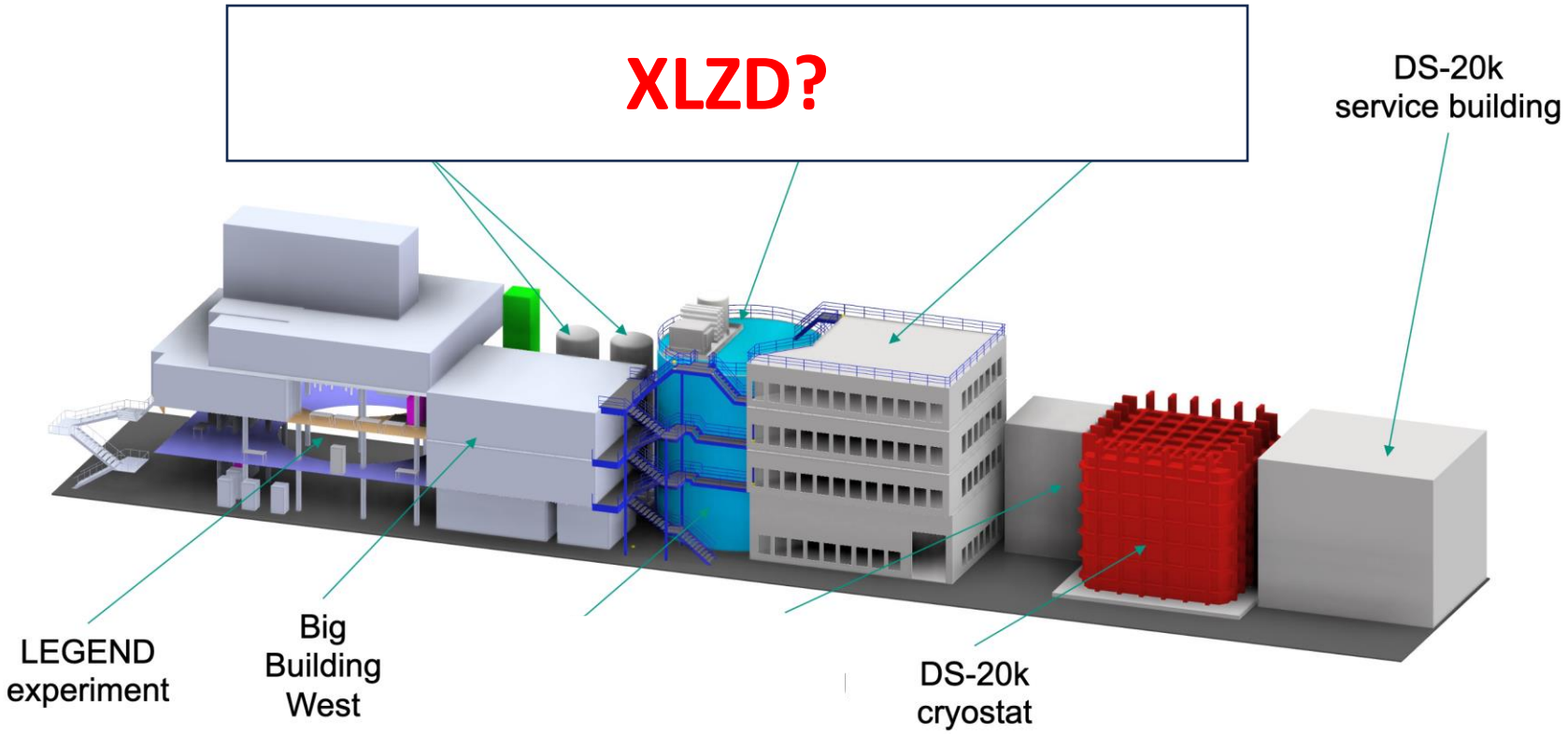
The new design for the hall C imply:

- North part of the dedicated to Legend1000
- DarkSide20k is under construction in the South part
- There is available space (CTF+Storage) for new experiment

A new big cryogenic plant for LN production will be realized

- Just outside the hall on the south part
- Cryogenic distribution lines will be realized
- Construction will start during 2026

Possible Future Layout of Hall C



LNGS is available to support some aspects connected with the experimental infrastructures

- Engineering support on various aspects
- Construction of the water tank
- Support for the radon free air plant
- Clean rooms in underground and above ground
- Access to: material screening (STELLA and Chemical labs), mech. workshop, electronic lab

Conclusion

- LNGS is proceeding in the refurbishment of infrastructures and services
- The technical staff is organized to support experiment and facilities
- The PNRR program will be completed for the beginning of 2026
- Borexino infrastructures will be completely removed before the end of 2026
- The reconfiguration of Hall C is ongoing
- Dedicated advanced plants will be available (LN liquefiuer, STELLA facility, Clean rooms, ..)
- LNGS is ready to help in design and construction of new experiment
- LNGS is also available to support possible future activities on present experiments


INFN
LNGS