Alice Recoque
Exa-DoST Annual Meeting

Xavier DELARUELLE

6 novembre 2025

JULES VERNE: THE FRENCH LED EXASCALE CONSORTIUM

Name of the consortium: Jules Verne

Name of the supercomputer: Alice Recoque

Organization of the french application

- GENCI *Hosting Entity*
- CEA *Hosting Site*
- SURF (NL) and GRNET (GR) as members of the consortium

Full TCO over 5 years: 554 M€ (50% EuroHPC, 50% consortium)

Hosting Entity selection	Call for tender	System installation	Exascale system in production at TGCC
June 2023	2024/5	2026	2027

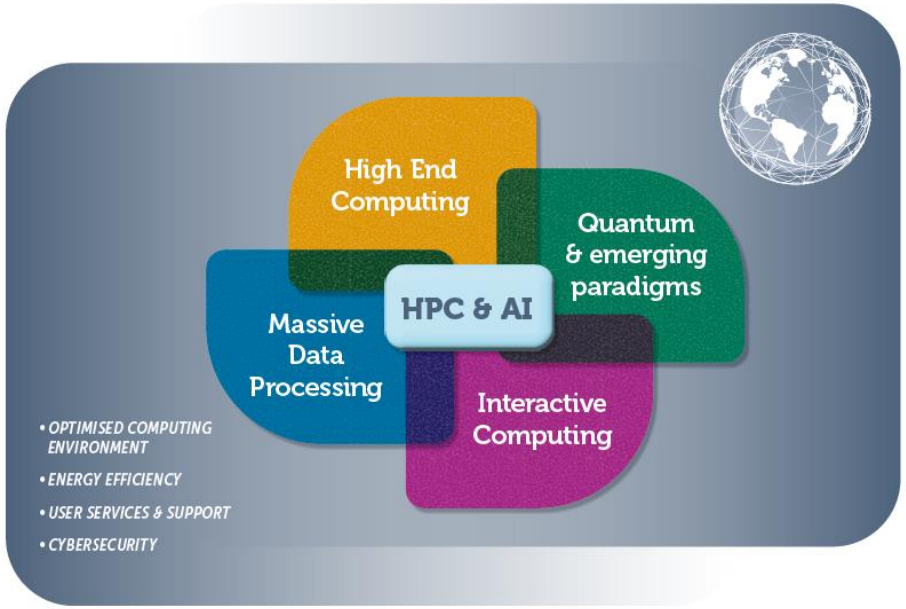
Tender procedure driven by EuroHPC with HE

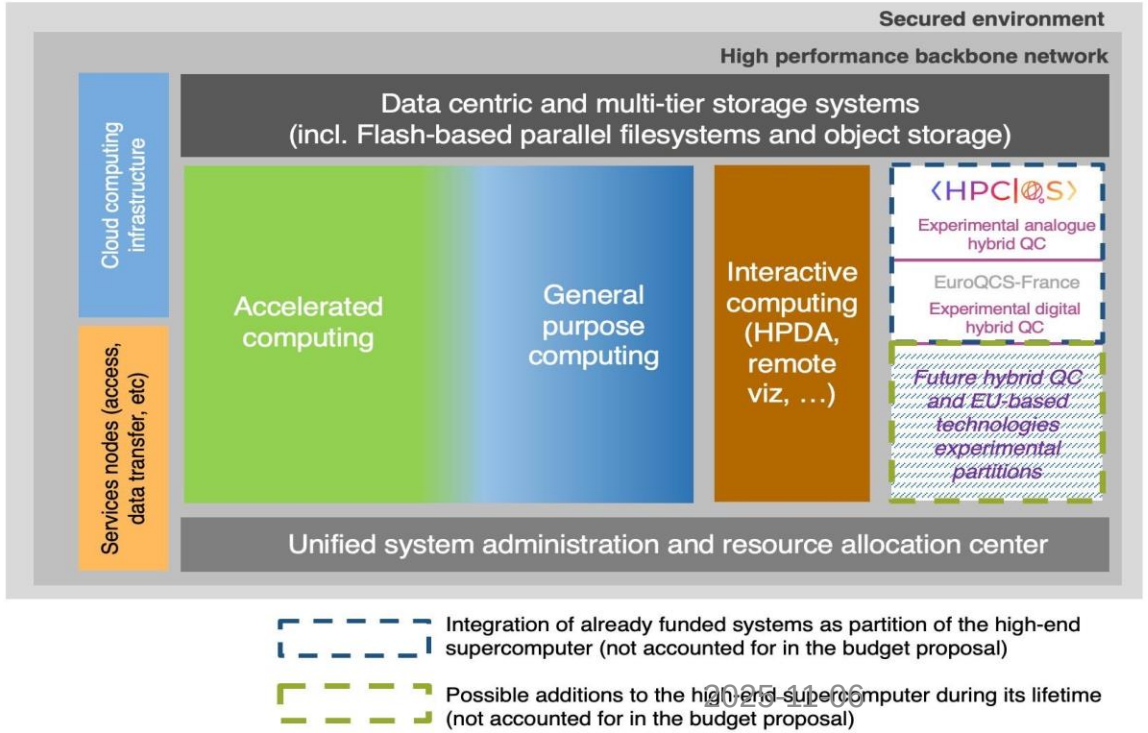
- Sept. 2024: Exascale call for tender
- H1 2025: Competitive dialogue
- Sept. 2025: Final offers
- 2026: Delivery and installation at TGCC
- 2027: Production for 5 years
- Q1 2026: start of the inception programme

Courtesy of GENCI

Alice Recoque: Exascale HPC/AI computing

- **Alice Recoque: 2nd EuroHPC exascale supercomputer in Europe**
  - **Request For Proposal still in progress, Installation 2026, Operational 2027**
  - HPL performance: **1+ Eflops HPL (GPUs) & 30 PF CPU < 20 MW**
  - A system integrating **European hardware / software technologies** in terms of computing, storage, network, infrastructure, middleware, applications…
  - Addressing societal and scientific challenges via **AI, large scale numerical simulations** and **massive data analysis**
  - **10+ HLST,** + companion projects PEPR **NumPEx**, **CExA-Kokkos**, CoEs, nCCs, Minerva, Epicure, **AIFF**, …

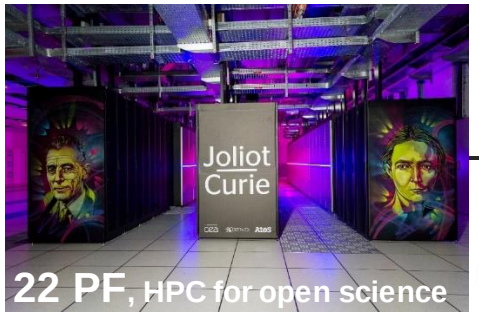




Infrastructure adaptation work

TGCC capacity before site upgrade for Alice Recoque

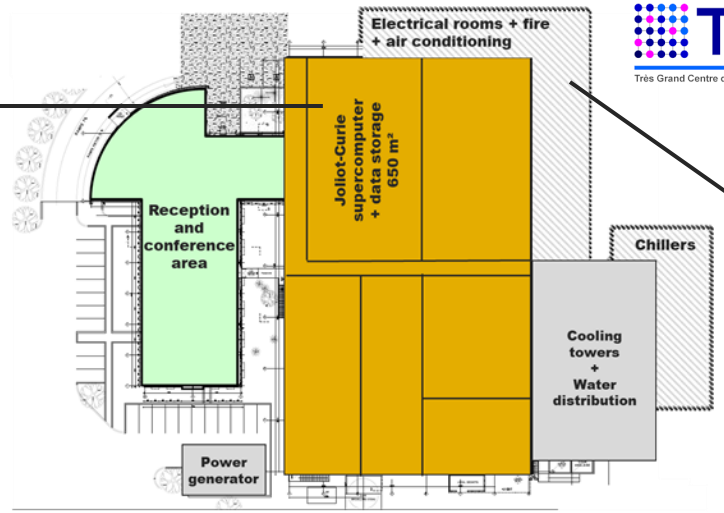
- **A computing centre built in 2009 to host and operate large scale supercomputers**
  - Computer rooms: **2,600 m²**, technical zone: **3,000 m²**
  - Electrical power capacity: **12 MW**, 1 MW UPS
  - Direct liquid cooling capacity: **cold water 10 MW** (PUE=1,4)
  - Renater (French NREN) node: **2 x 100 Gbit/s**



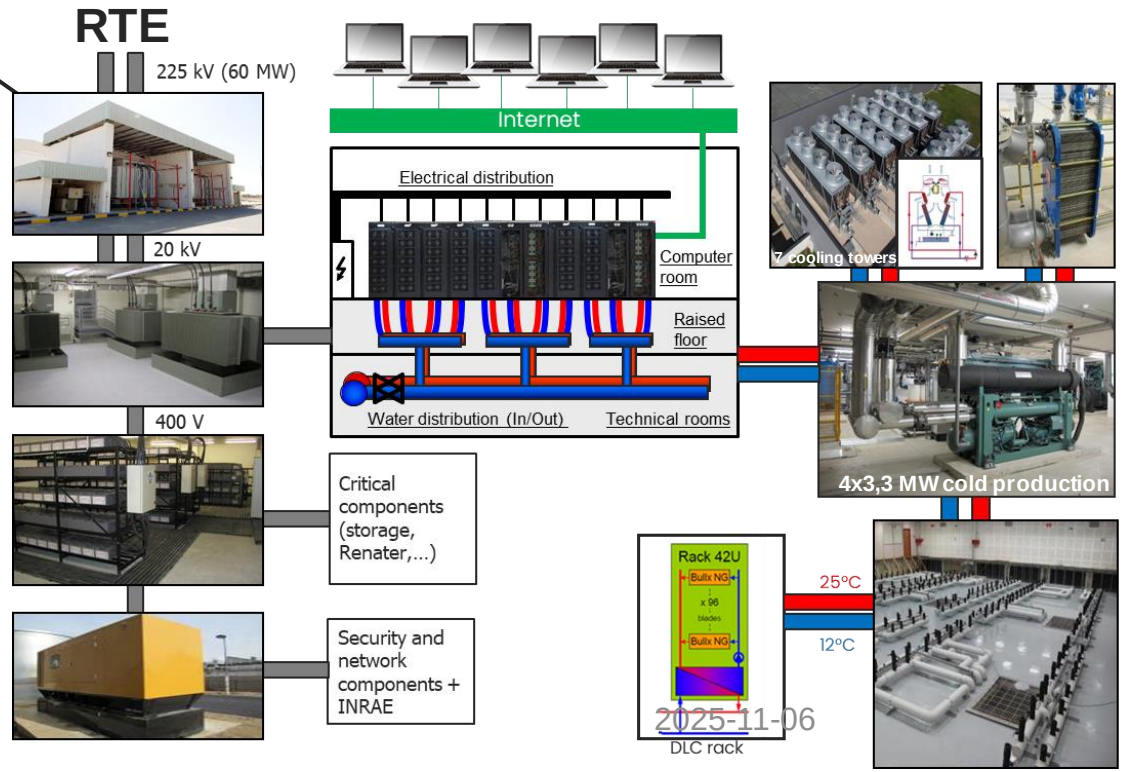
GENCI

~2 x 1500 users

CCRT Centre de calcul recherche et technologie



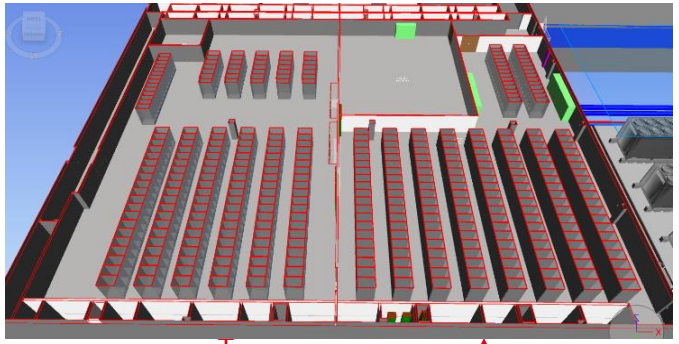
TGCC
Très Grand Centre de calcul du CEA



Overview of the adaptation work

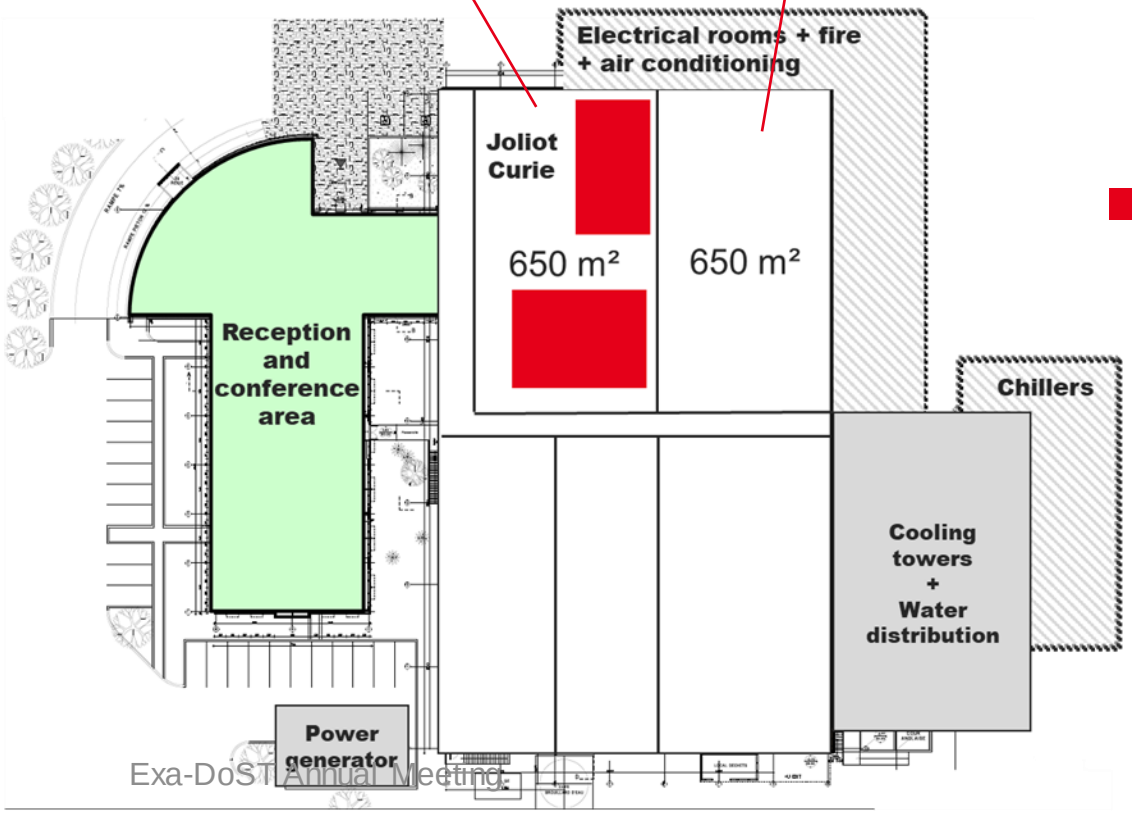
Room #2

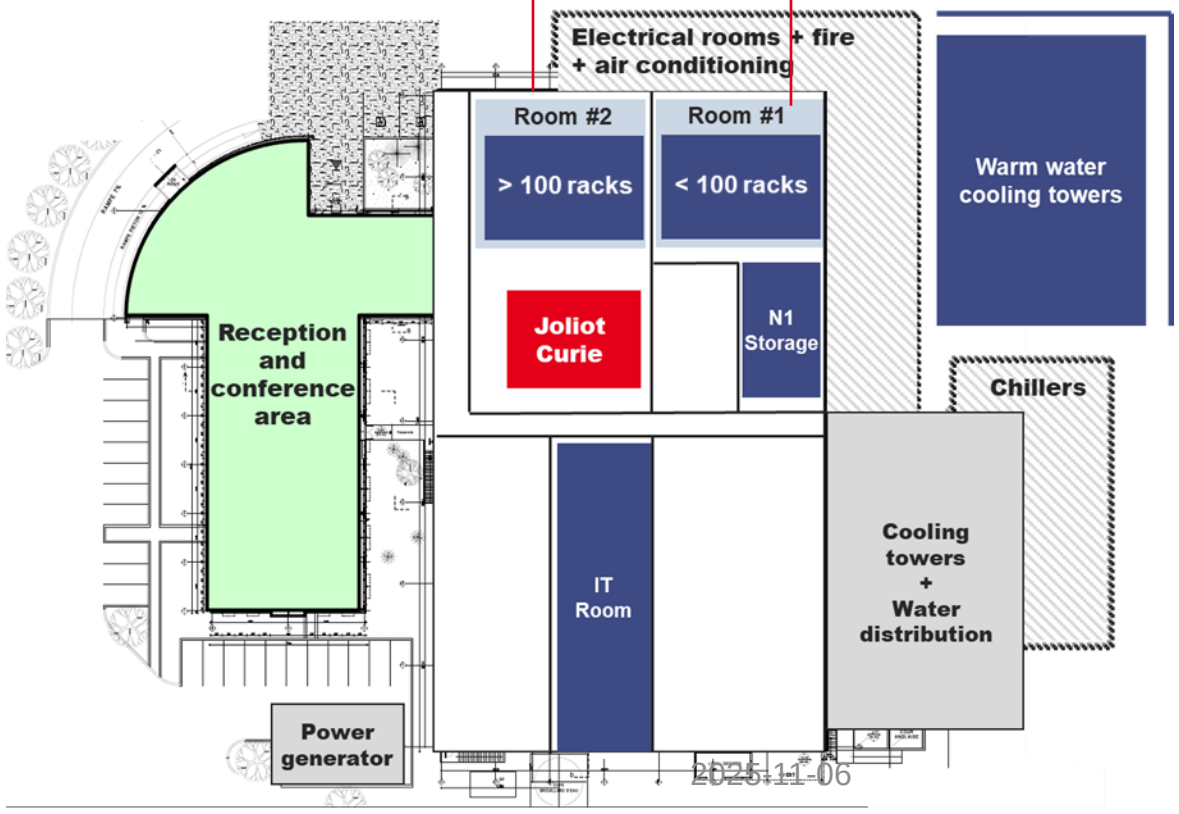
Room #1



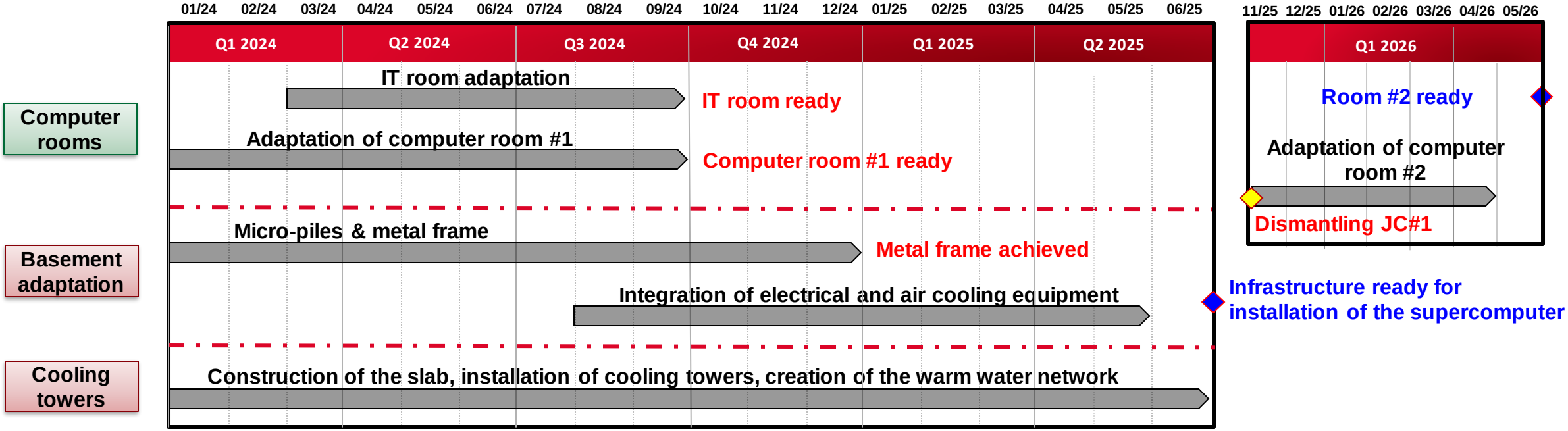
Room #2

Room #1



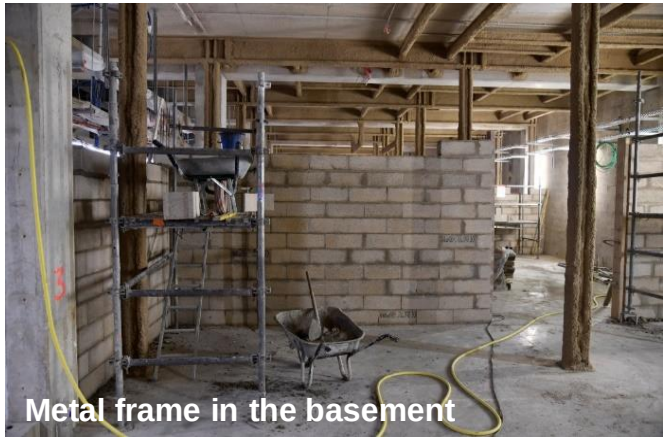


Main timeline of the adaptation work




IT room, water antenna installation

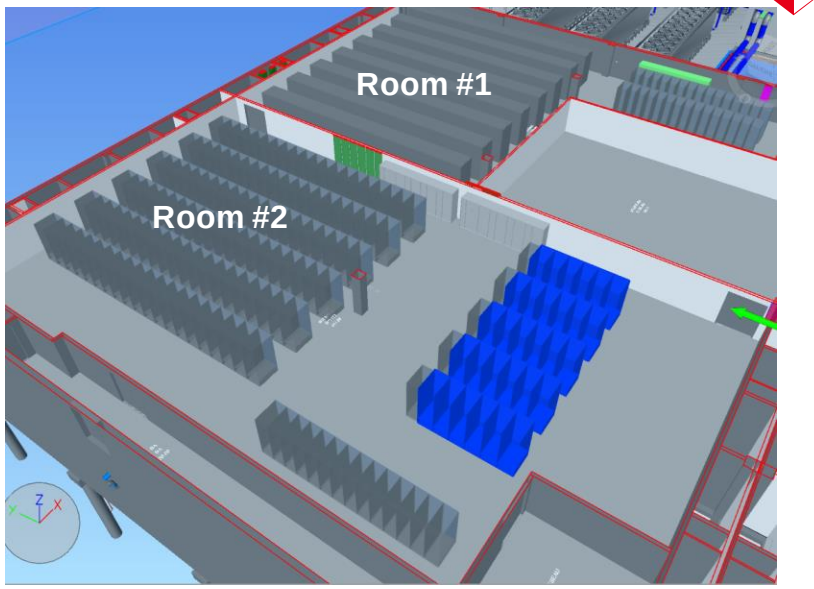
Room #1


Metal frame in the basement


Cooling towers

Adaptation of supercomputer rooms

- **Hosting capacity of room #1: ~80-100 computing cabinets**
  - Adaptation work handled by CEA in this room:
    - False ceiling removal; Room painting; Resin to prevent water infiltration
    - Fire detection and extinction systems adaptation
    - Power supply and cooling interfaces preparation; Local reinforcement
- **Hosting capacity of room #2: ~100 more computing cabinets**
  - Dismantling of Joliot-Curie phase 1, Nov. 2025
  - Interface preparation Q1-Q2/2026
- **Adaptation work handled by the vendor in the rooms:**
  - Power and water distribution, water leak detection system adaptation, raised floor strengthening



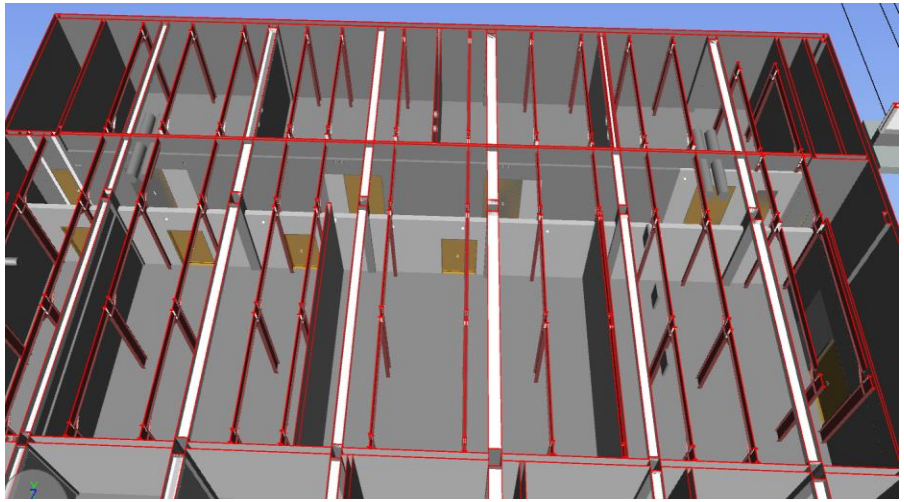

Room #1, original state

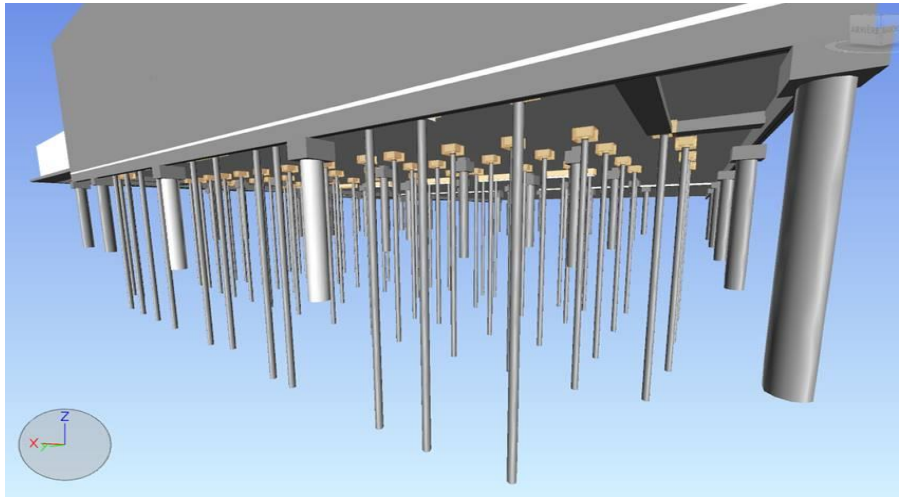

Room #1, partitioning

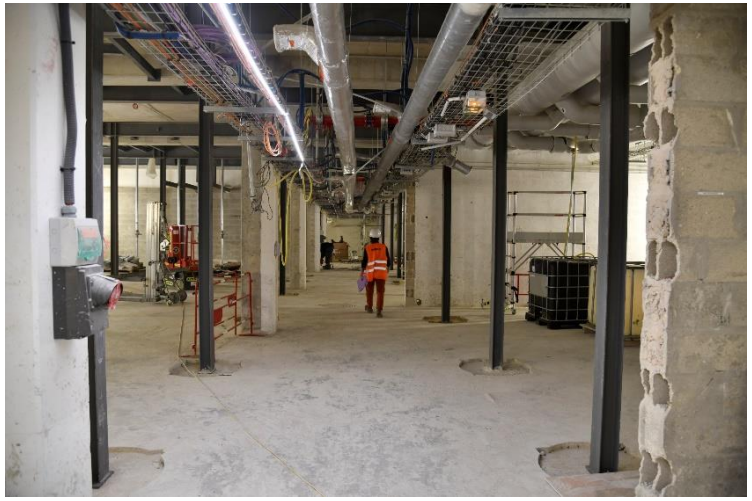
Room #1, final configuration

Strengthening the floor capacity up to 2800 kg/m² on a surface of 700 m²

- **In the basement:** Creation of a metal frame to sustain the computer room floor (67 micro-piles)
- **In the computer room:** Add local reinforcement, application of a resin to waterproof the slab

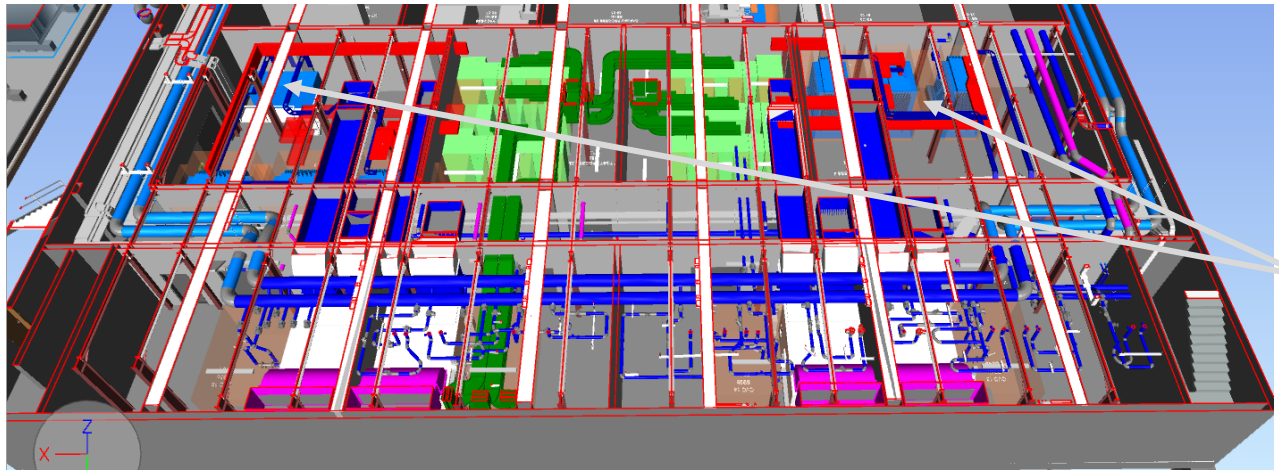






Power supply and air-handling

- **Power supply adaptation: adding 24 MW of electrical capacity**
  - Installation of 6 electric transformers of 4,2 MVA each, and its associated low voltage switchboards
  - Increase of the uninterruptible power supply (UPS) capacity up to 2 x 1,2 MVA
  - Distribution to the computer room handled by the vendor of the supercomputer
- **Adaptation of the air-handling system (25°C setting temperature in the computer room)**
  - Up to 400 kW per computing room + redundancy



Electric transformer - Schneider
(6 x 4200 kVA ; 20kv / 420 v)

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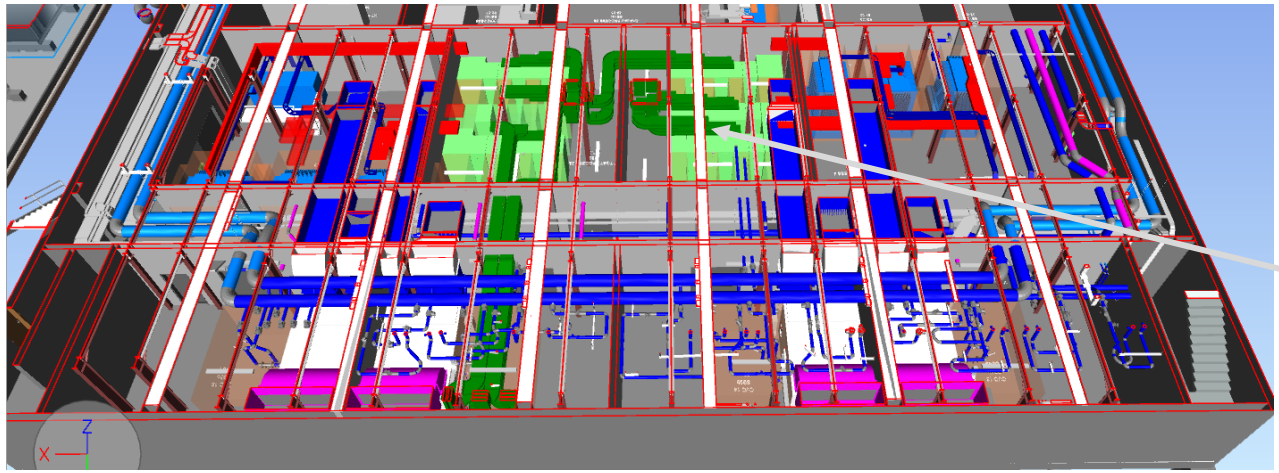

Main distribution panels - Schneider
(6 x 6300 A, bar ducts transformers/LV)

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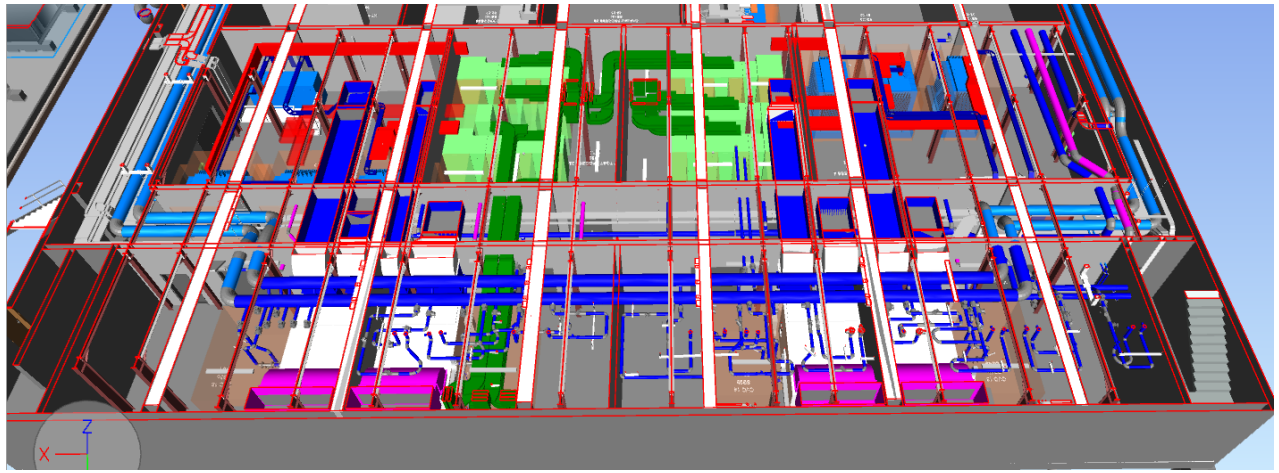

UPS – Socomec
(2 x 1200 kVA)

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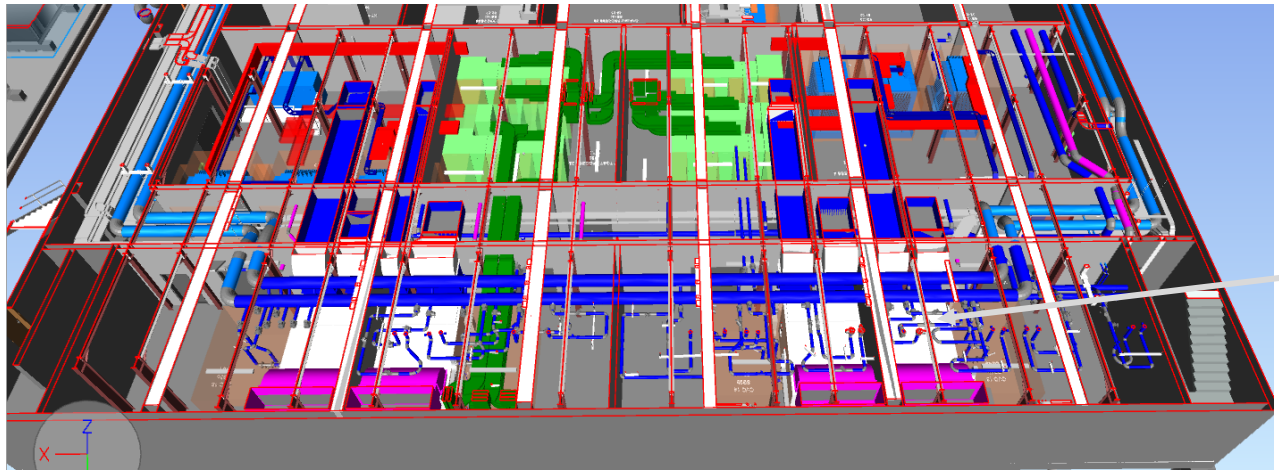


Air handlers - Trox technics
(3 x 250 kW + 2 x 225 kW)

Installation of 20 MW of warm water cooling

- Construction of a concrete slab for the cooling towers and a new machine room for pumps, …
- Adaptation of the rainwater collection system; Construction of a noise-damping wall
- Installation of 8 dry adiabatic cooling towers (Jaeggi, 2,5 MW 35/50°C water with air condition of 35°C/40%), pumps, water distribution networks to the computer rooms
- Valves awaiting connection to a heat reuse system currently being discussed

IT environment

The nest to host Alice Recoque System

- Renew central equipment of the computing center
  - Admin zone : Build and Run the System, Handle users, Support
  - Cyber zone : Protect from external and internal threats, Analyze behaviors
  - Service zone : Provide services to the System, its Users and Support team

- Provide central commodities
  - AAA, DNS, Time sync, System admin services, SSH gateways, Web proxies, …
  - Backbone network : reach computing center in/out @400 Gbps (2027), then @1Tbps (2030)
  - HOME storage (NFS) : 50 TB
  - Long-term storage : 200 PB, then 500 PB

Building a new computing center

- The installation of this IT environment is not just an equipment renewal
  - We are building a totally new environment from scratch

- Split of our shared HPC environment
  - Up to now there was a shared IT environment between Joliot-Curie (GENCI) and CCRT
  - Split is important to better fit both needs
    - An Open Science environment for the Alice Recoque System
    - A more protected environment for CCRT industrials

- Better integrate with external resources
  - Easily reach Web resources from the computing center
  - Cloud resources (OpenStack-like) integrated into the computing center, yet reachable from Outside

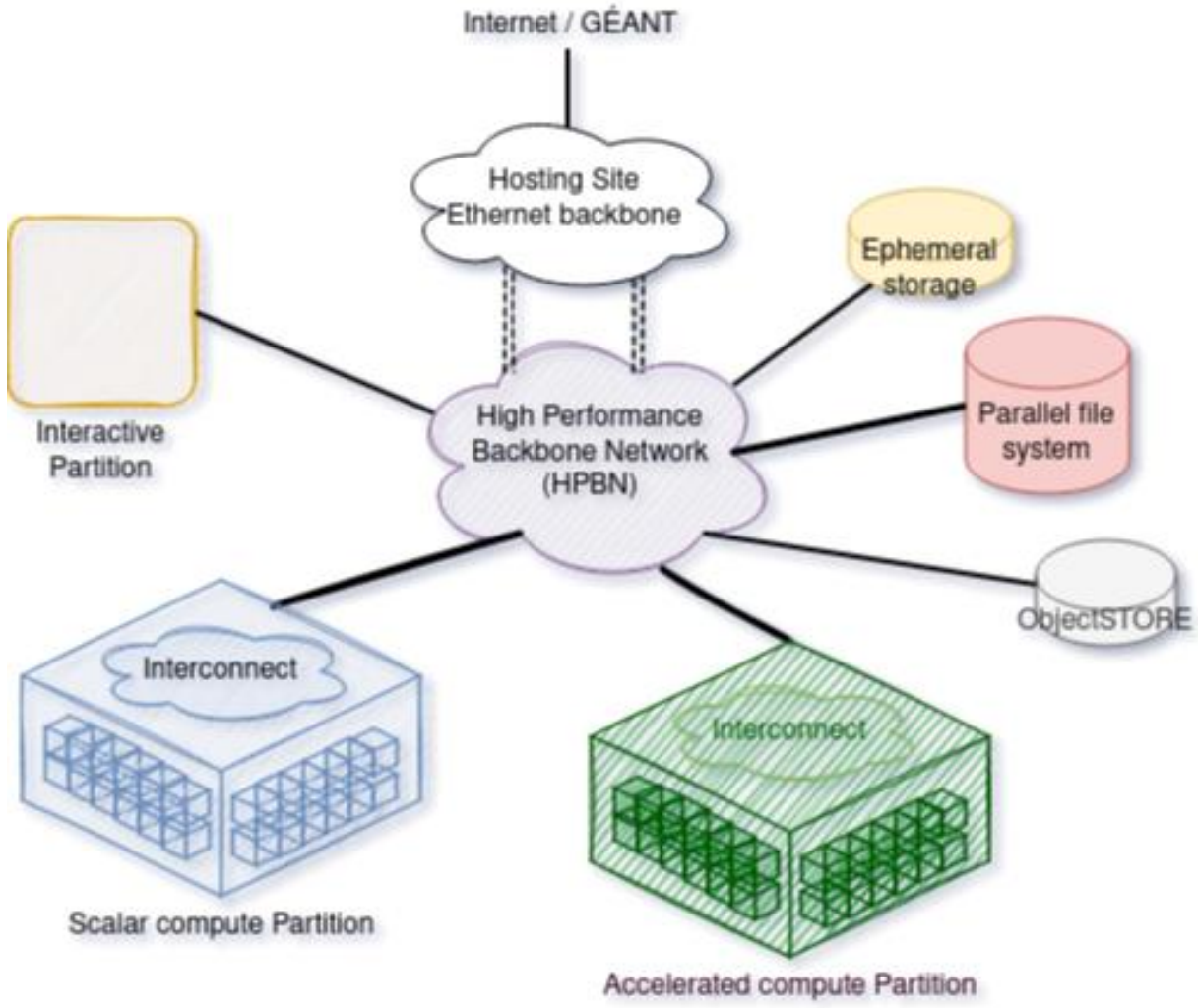
Alice Recoque System

Procurement status

- Tenders have been evaluated
- Candidates are currently being notified

- Configuration of the System cannot be disclosed yet
- But specifications headlines can be shared

System architecture



Compute resources

- EU technologies are a priority

- Accelerated partition (GPU) should reach 1 ExaFlops Linpack
  - ≥ 2 GPU per node
  - ≥ 144 GB of memory per GPU
  - Unified memory between CPU and GPU
  - ≥ 400 Gbps network link per GPU

- Scalar resources should reach 30 Petaflops
  - ≥ 2 GB of memory per CPU core
  - ≥ 200 Gbps per socket

- A unified partition mixing scalar and accelerated workloads is the preferred approach

Complementary compute resources

- Login nodes
  - With data transfer and remote visualization capabilities
  - Should support at least 300 simultaneous active users
- HPDA nodes
  - 34 visualization nodes equipped with 2x the amount of memory of compute nodes
  - 6 very large memory nodes with 4x the amount of memory of compute nodes
- Cloud partition to host VM of communities
  - Reachable from the Internet
  - Closer to the Supercomputer than what we have now with TGCC cloud

Storage

- Flash storage: 30PB @3TB/s
- High-capacity storage: 200PB @1TB/s

- Organized into a unified parallel file system
  - SCRATCH, WORK and STORE will be a Lustre single file system
  - Slice of the flash for the long-term storage space
  - Slice of the high-capacity for the temporarily storage space

- Object STORE (S3 protocol) on top of this parallel file system @3GB/s

Software stack

- Open-source solutions are a priority

- OS: RedHat-like
- Batch scheduler: Slurm
- Parallel file system: Lustre
- Container/VM over Batch: PCOCC
- Cloud provisioning: OpenStack

- Provisioning HPC/AI/QC software catalog
  - Not yet decided what tool will be used (Easybuild, Spack, GUIX)
  - For sure there will be a "module" interface for users
  - Aim at providing ways for communities to build their stack on the System and providing it to users

Next steps

To Exascale and Beyond

- November : announcement of Alice Recoque's main characteristics and Supplier
  - Hopefully during SC'25
- Early 2026 : Ignite of the Advanced Support Team
  - First support/development activities
- H1 2026 : IT environment deployment
- Q2 2026 : Start of the adaptation work of the compute room by the Supplier
- Q4 2026 : Start of the delivery of the System
- Q2 2027 : Reach 1 ExaFlops Linpack
- H2 2027 : Start of the operations phase of the System