

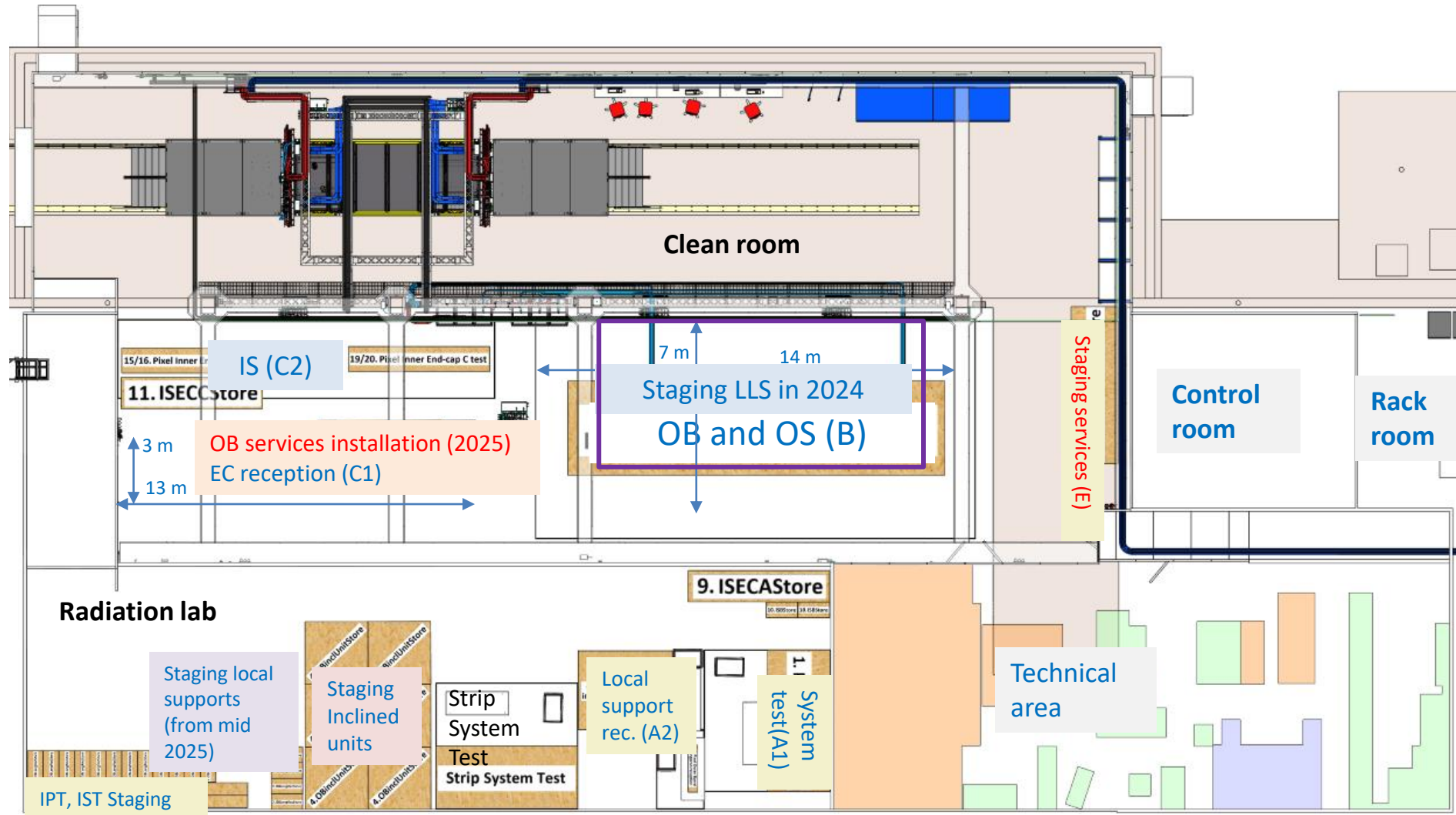
Input on EC reception test in SR1

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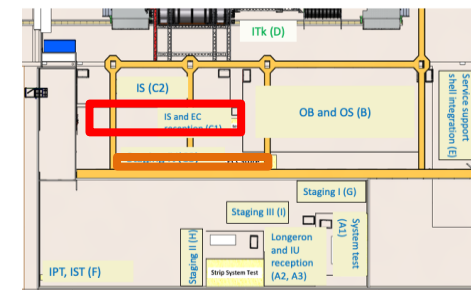
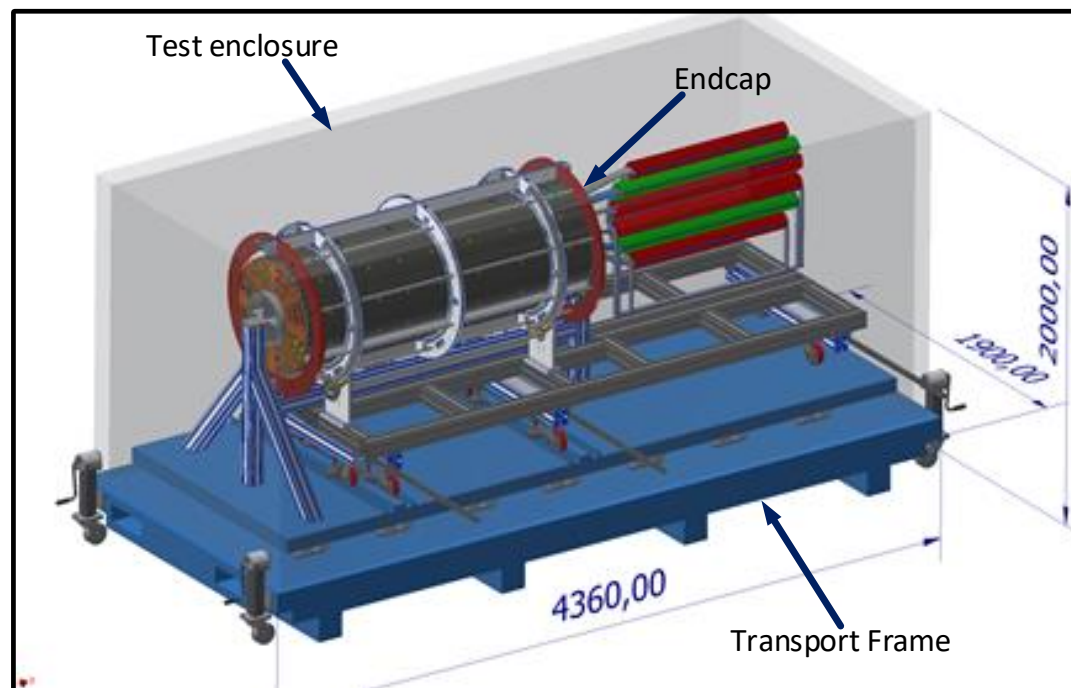
Updated overview on usage of space by Pixels in SR1

- Five test areas will be operated in parallel during ITk Pixel integration
- Pixel system test (area A1)
- Pixel OB loaded local support reception (area A2)
- **OB type-1 cable installation in 2025 and EC reception (area C1).**
- Outer Barrel (OB) and OS integration (area B)
- Inner system reception and integration (area C2)
- OB type-1 services reception and staging (area E)
- Staging of IPT, IST, ECs, IS segments in several areas
- Updated layout document in preparation



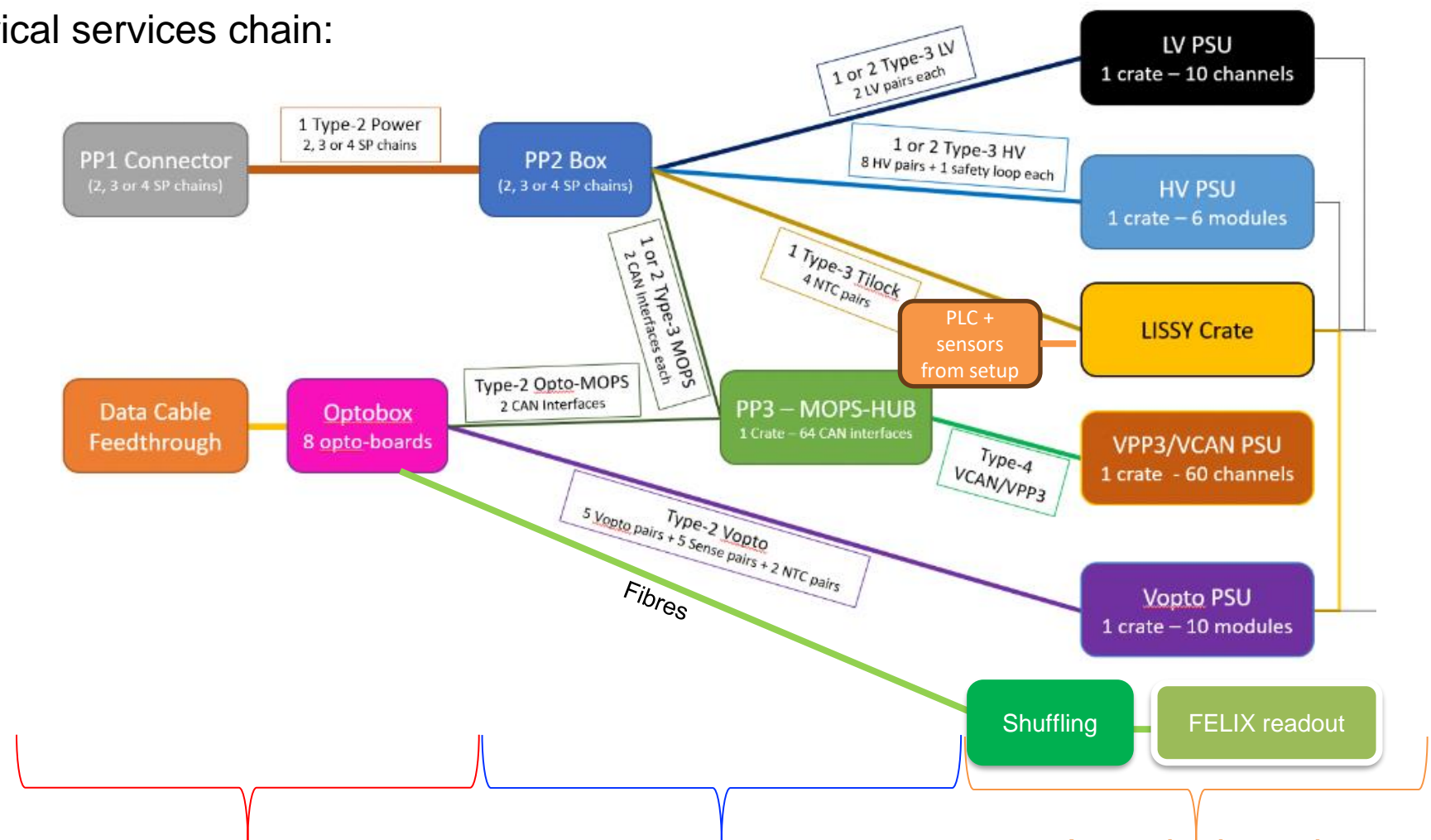
EC reception test area

- **Area: 6 m x 3 m x 2.5 m**
- Transport box + 1 electrical rack + 1 cooling rack
- Same area for sequential test of each endcap
- Opening of transport box requires 13 m long area temporarily
- **Area for staging**
- 1 cooling loop equivalent to 1 PP1 CFT in reception test area
- **Equipment first used in integration sites outside of SR1**
- **Shipped with ECs, then one set installed in reception test area, second directly in OS integration area**



Electrical services for ITk Pixel in surface testing

- Electrical services chain:



- In SR1 **On setups in clean room** **In racks in next to setups** **In racks in rack room**

Preparatory tasks for EC Reception test in area C1



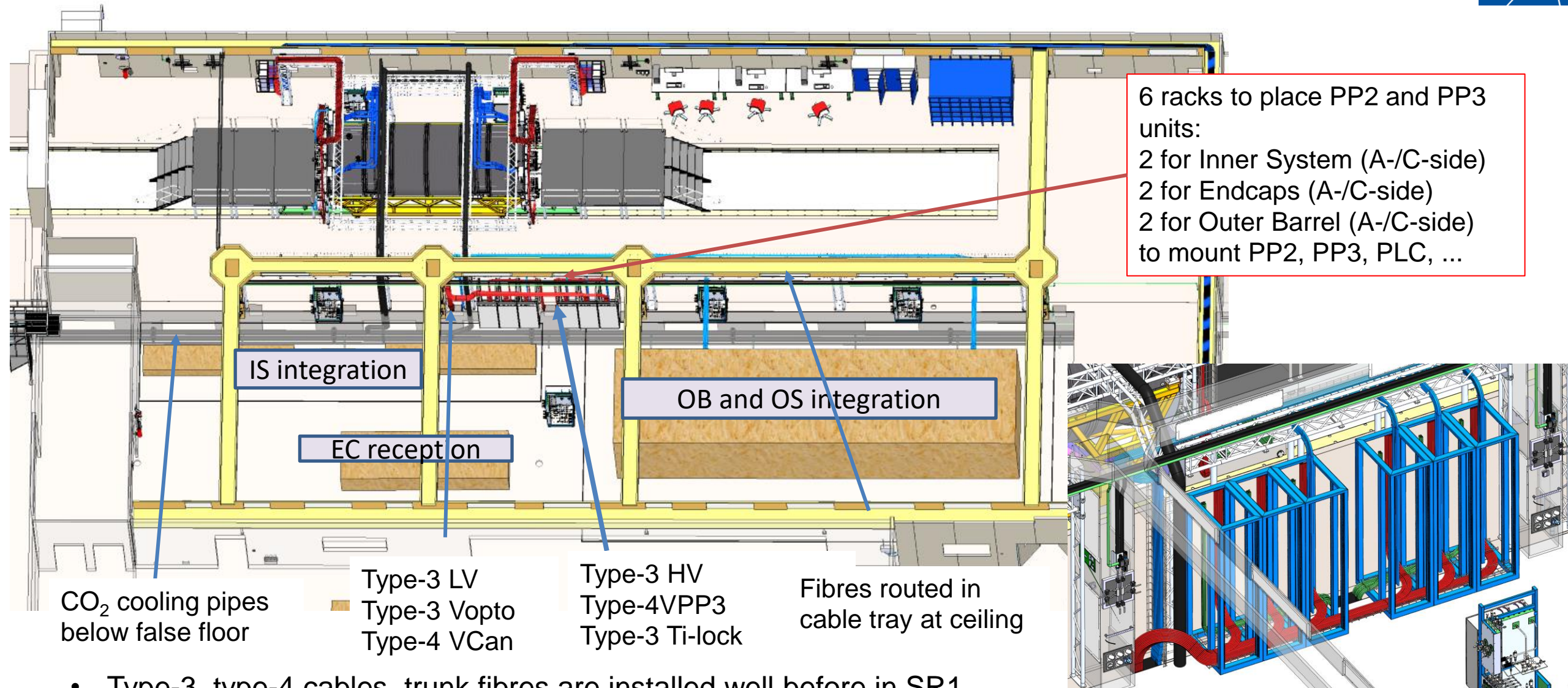
Before arrival of EC test equipment

- Cooling racks and dry-air, monophase supply to commission from outlets up to connection to detector manifold
- Cooling pipes from cooling rack to manifold to design and produce, install and commission
- Monophase cooling pipes from wall outlets to optopanel to design, purchase and install and commission
- Installation of cable trays, etc. as needed
- Preparation of mapping, should be same like in integration testing in Frascati and Liverpool

After arrival of EC electrical test equipment

- Installation of PP2, PP3, optopanel, shuffle boxes, type-2 cables, power supplies, FELIX PCs, Interlock, DCS PC, environmental cables and readout. Type-3 cables, trunk fibres are installed well beforehand in SR1
- Deployment of new DSS Server matrix and verification. Commissioning of PP2, PP3, optopanel, shuffle boxes, type-2 cables, power supplies, FELIX PCs, Interlock, DCS PC, environmental cables and readout.

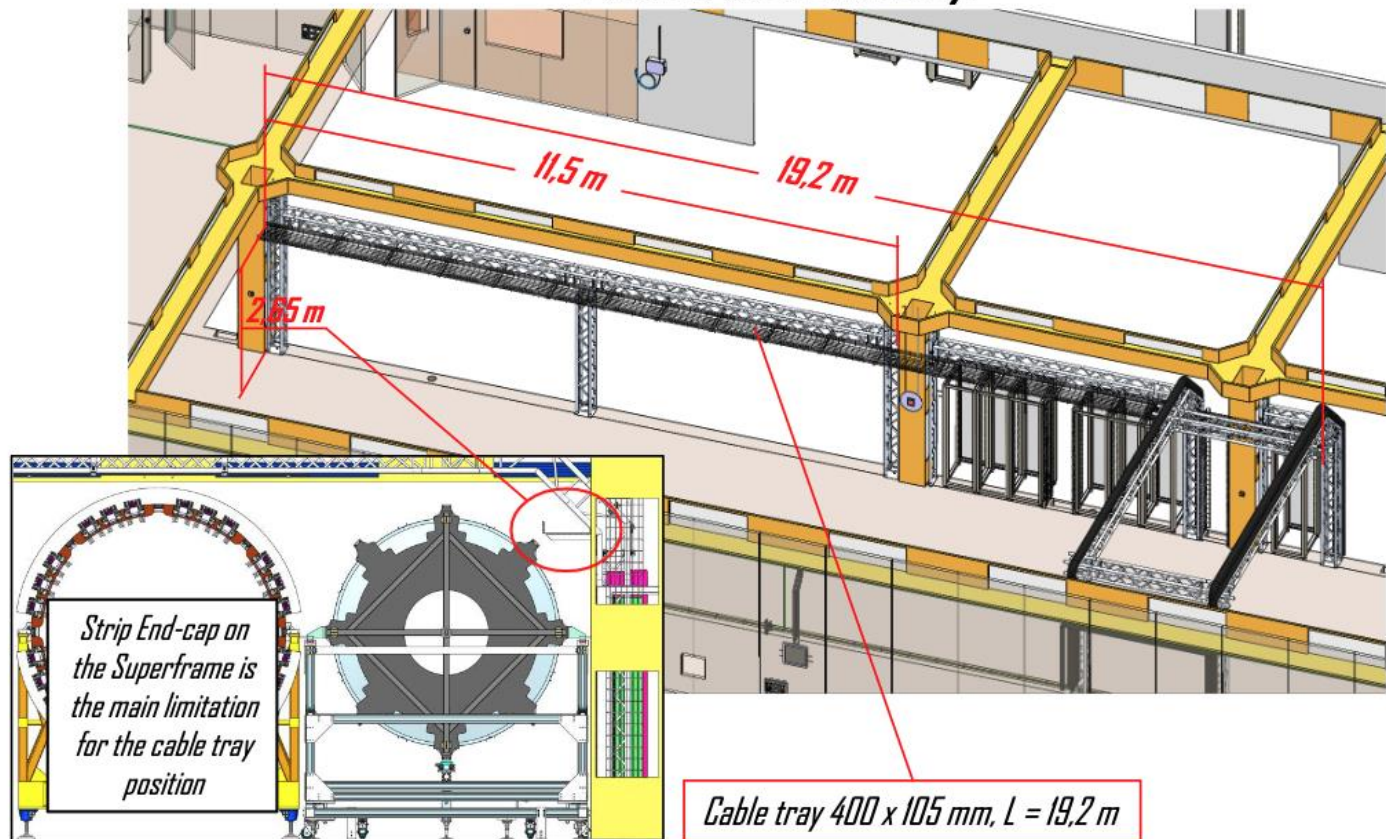
Routing of cables from below false floor to racks in SR1 clean room



- Type-3, type-4 cables, trunk fibres are installed well before in SR1

Routing of cables in SR1 clean room

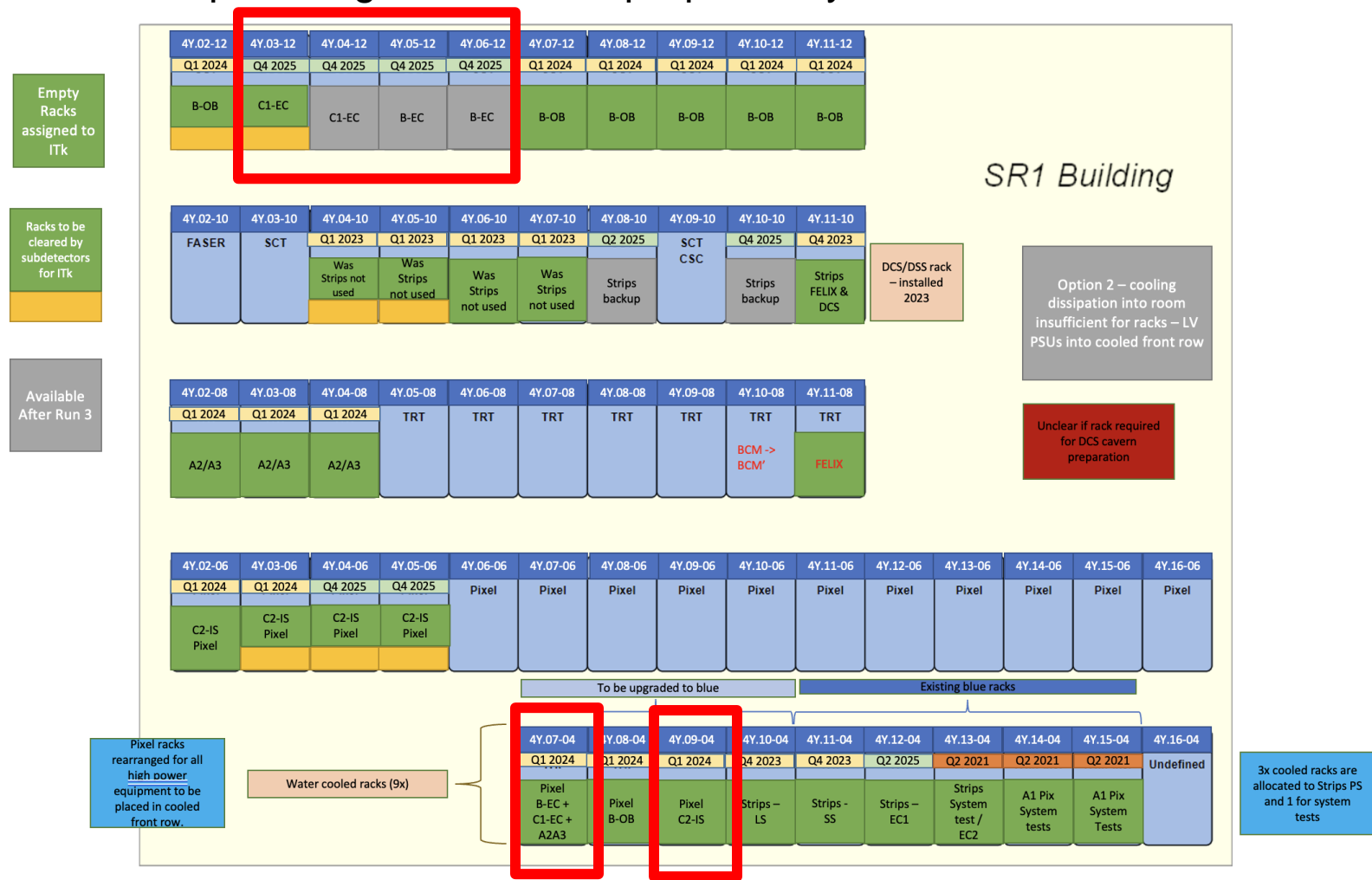
Pixel services cable tray.



- Cable trays and cables inside clean room will be moved and re-installed when Pixel is inserted in Itk
- Installation and later re-routing of type-2 cables, type-3 Vopto and fibres required
- Racks and other type-3 and type-4 cables won't be moved.
- To design, purchase and install cable tray from rack to EC reception setup. OB will prepare the cable trays to Outer System Test setup

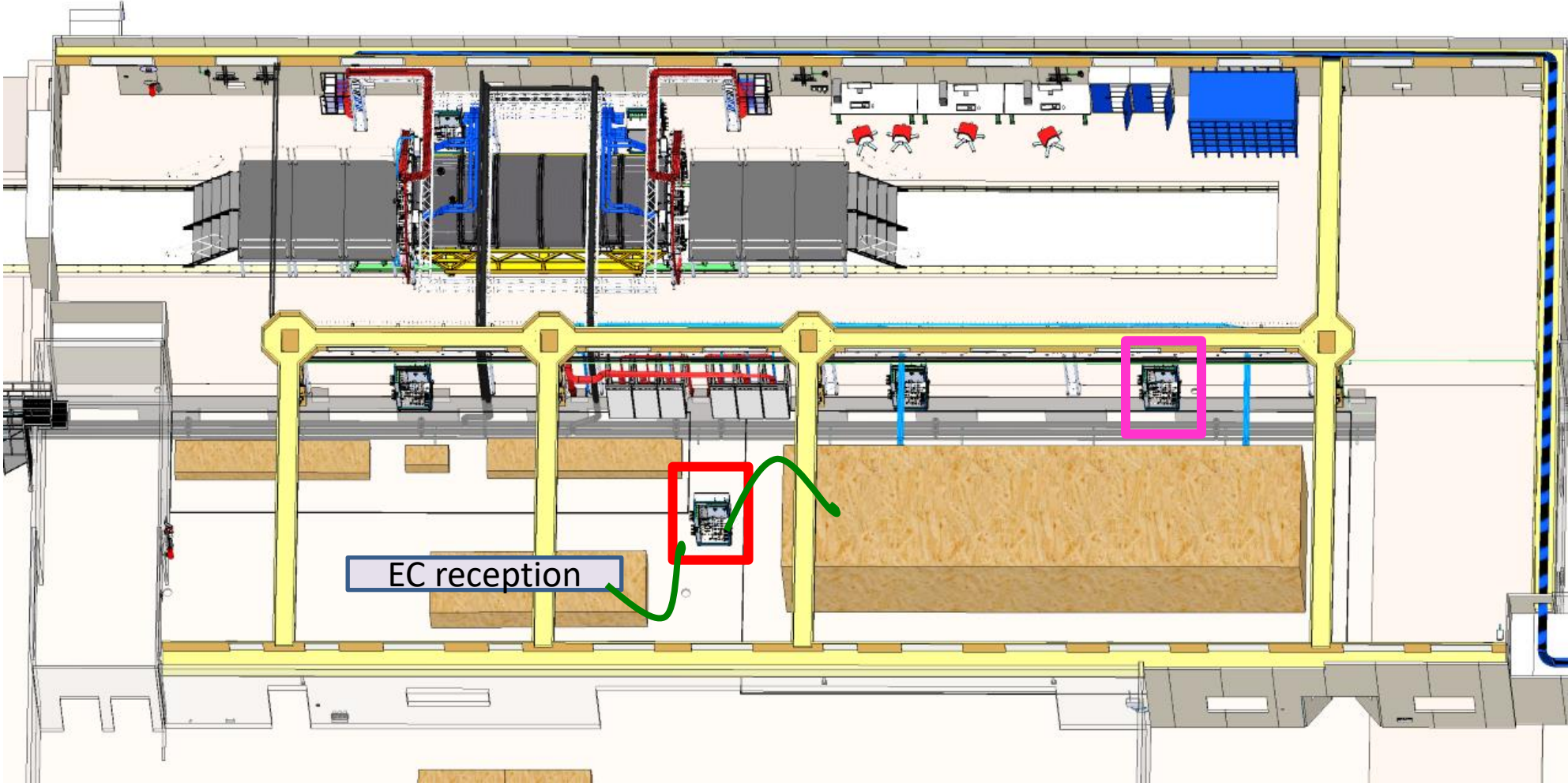
Rack usage in SR1 rack room

- 4 racks in rack room for EC equipment. Rails were purchased. Installation of equipment when EC equipment will have arrived.
- Network and powering in each rack prepared by beforehand like for Outer Barrel racks



Documentation:
[EDMS 2686552](#)
 and [EDMS 2959413](#)

CO₂ Cooling rack and piping



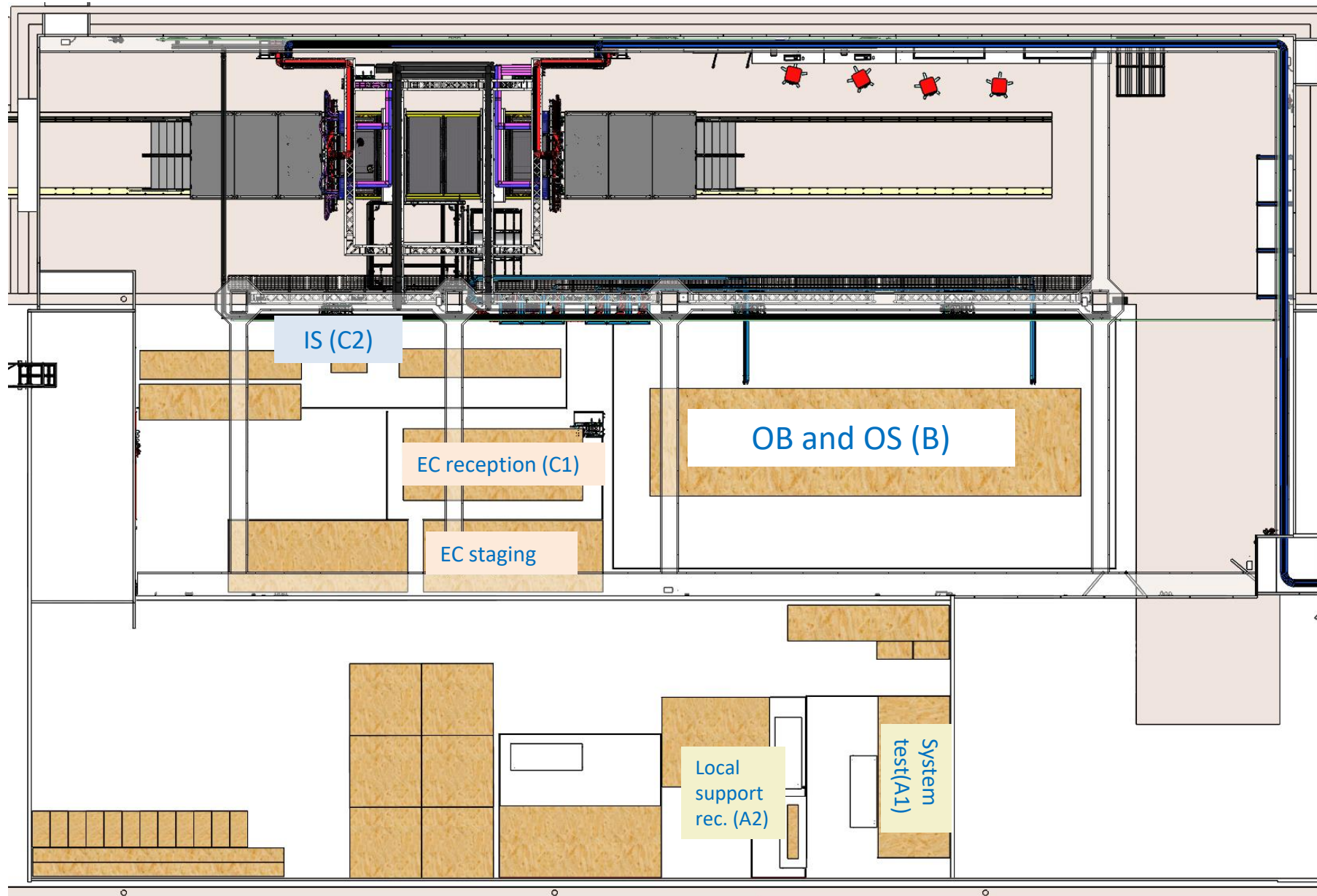
Piping required to connect from **cooling rack** to EC for reception test and then also when in Outer System

In OS testing: EC-C uses the reception rack, EC-A will have to be connected to **cooling rack** next to Outer System setup

Movement and staging of Endcaps

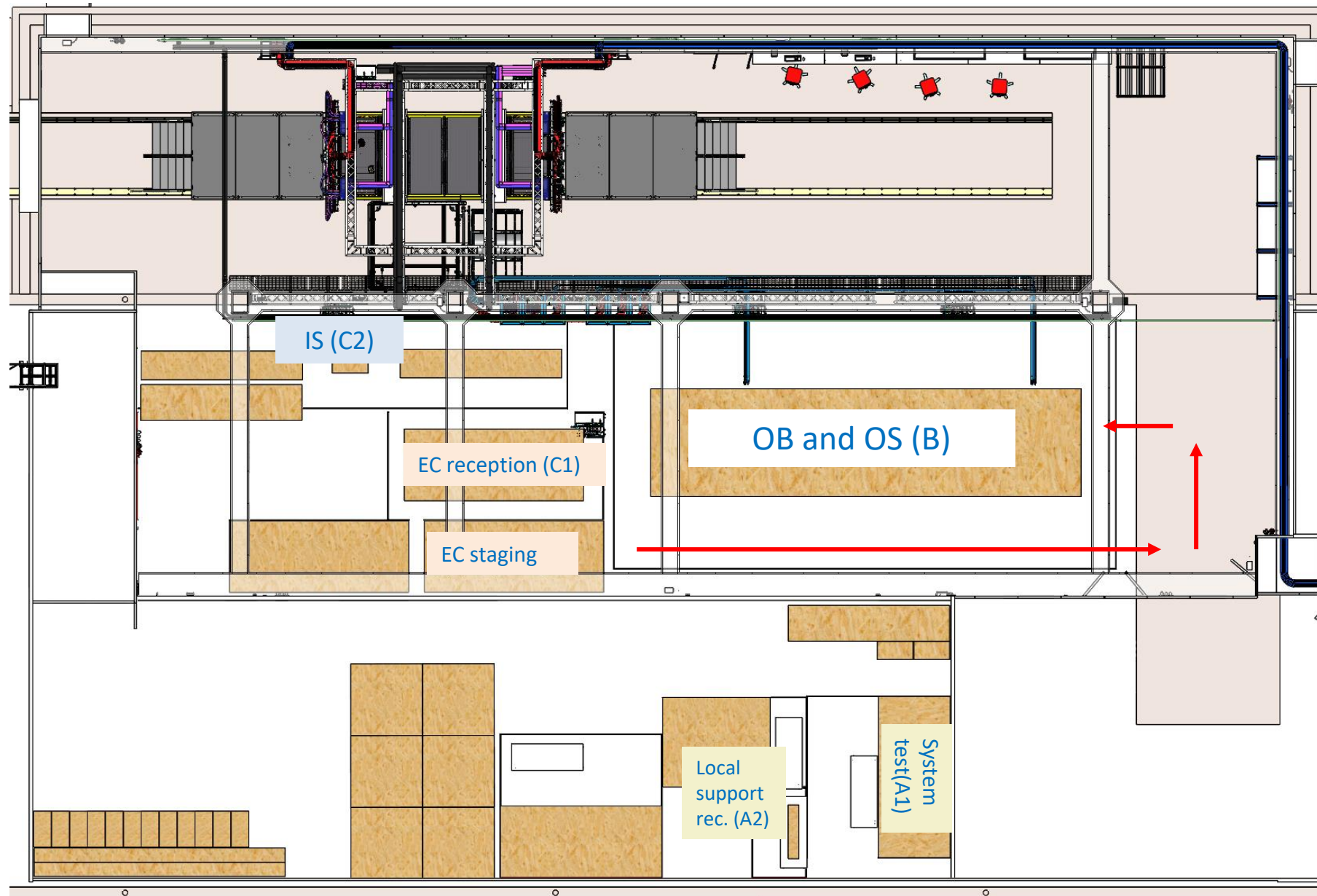
Situation when all IS, EC and OB parts are in SR1

Staging of Endcap along the wall before moving it for Outer System integration



Movement and staging of Endcaps

Moving the EC-A for Outer System integration



Reception test

- CO₂ cooling and electrical test equipment available to test 12% of each Endcap and in same steps as during integration in assembly sites
- Test to check that nothing got damaged during transport or handling
- Details to be fully defined
 - Same test like completed endcap: connectivity, warm and sealed or shorter test of functionality with ping test only?

SPARE



Comments on space in SR1

- Allowed loads on floor
 - See <https://edms.cern.ch/document/2818071/>
 - loads 10x10 cm²: 350kg, distributed 2t/m²
- Size of door into clean room: components should be below 2.84 m wide. Dimensions are 147cm x 300cm per door, so the full opening would be 294cm x 300cm.
- SR1 foreseen to become status “clean” and will be prepared for start of Strip integration this March
- A new SR1 training online course is in preparation

Off-detector cables and equipment for testing



- Orders for most flavours of off-detector cables placed.
- Overview of number of parts can be found on [EDMS 2685862](#)
- First ones will arrive in February/March, bulk of type-3 cables in Summer → Reception test to be conducted by Pixel integration team with help of Off-detector team. Person power at CERN required for 2-3 months! Afterwards, shipment of components to sites and SR1.
- Opto-panels for surface testing: Next discussion with Opto-team foreseen (February). Requires more mature trolley designs.
- Frascati team ordered prototypes for twinax extensions. Expected to become available for validation in February.

Equipment for electrical surface testing

- Connectivity table for surface testing includes **quantities of required equipment for testing** [EDMS 2685862](#). The equipment will allow for testing of 12.5% of ITk Pixel in one step. The cost sharing was agreed and **purchasing of components started**.
 - **Availability of power supplies depending on units via market survey/tender. Moreover, PP3 crates in development phase.** Both components being followed-up to have enough of them available and commissioned for the start of integration.
 - **Equipment (PP2, type-2, type-3) and readout for environmental sensors** prepared by DCS team.
- **List of general equipment for SR1** was collected. **Purchasing (Lot1, Lot2, Lot3 and Lot4) started** after reviews [EDMS 2655682](#).
- Several **documents are on EDMS related to testing** of ITk Pixel during integration: [EDMS ATL-0000010753](#)

		Create new document	Attach document	Detach	Auto Link	Export to Excel	Request access
<input type="checkbox"/>	# ..	Id	Title	Files			
<input type="checkbox"/>	10	AT2-IP-AN-0002 v	Requirements and specifications for ITk Pixel Integration in SR1	8			
<input type="checkbox"/>	20	AT2-IP-MC-0002 v	Equipment for testing during Pixel Integration - Overview spreadsheet and cost sharing	5			
<input type="checkbox"/>	30	AT2-IP-ER-0014 v	Rackpopulation in SR1 for ITk Pixel integration	4			
<input type="checkbox"/>	40	AT2-IP-EY-0005 v	ITk Pixel Interlock Strategy for integration-Addendum ITk Interlock Strategy document	6			
<input type="checkbox"/>	50	AT2-IP-IN-0002 v	Itk pixel cables for surface testing	3			
<input type="checkbox"/>	60	AT2-IP-AN-0005 v	Coolingrack positions in SR1	1			
<input type="checkbox"/>	70	AT2-IP-IN-0003 v	Routing of ITk pixel cables for surface testing in SR1/B2175	2			

PP2 in racks

- Rack size in CAD modell: 900 mm T, 600 mm W, height 52U TBC
- Racks have with either 4, 7 or 9 PP2 crates.
 Proposal: PP2 placement will be at the bottom of the rack, above the type-3/4 cable trays. This means the PP2 crate is facing with connectors downward and upward.
 Height: 10U
- Other items in the racks are:
 - PP3 MOPShub (up to 2) 10U . The depth is 400 mm. The MOPS-HUB crate houses 2 blocks, each block has one power cable (2 pairs), which connects to the back. All other cables connect from the front.
 - PLC Siematic 10U
 - power unit on top 4U
 - plate for pulse generator lab instrument and ethernet routed 3U
 - PP2 for environmental sensors, size unclear

