HIE ISOLDE Installation Progress

CATHI Final Review, 22-26 Sept. 2014, Barcelona, Spain

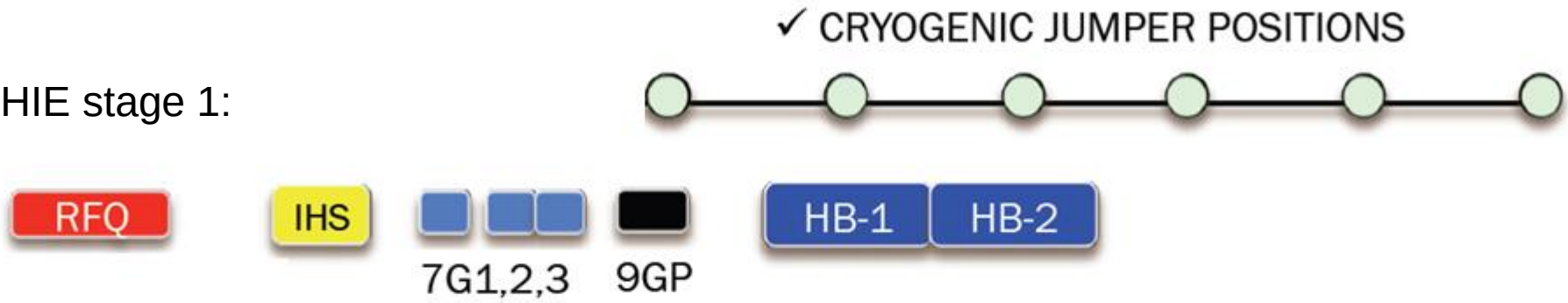
Erwin Siesling for the HIE ISOLDE integration team

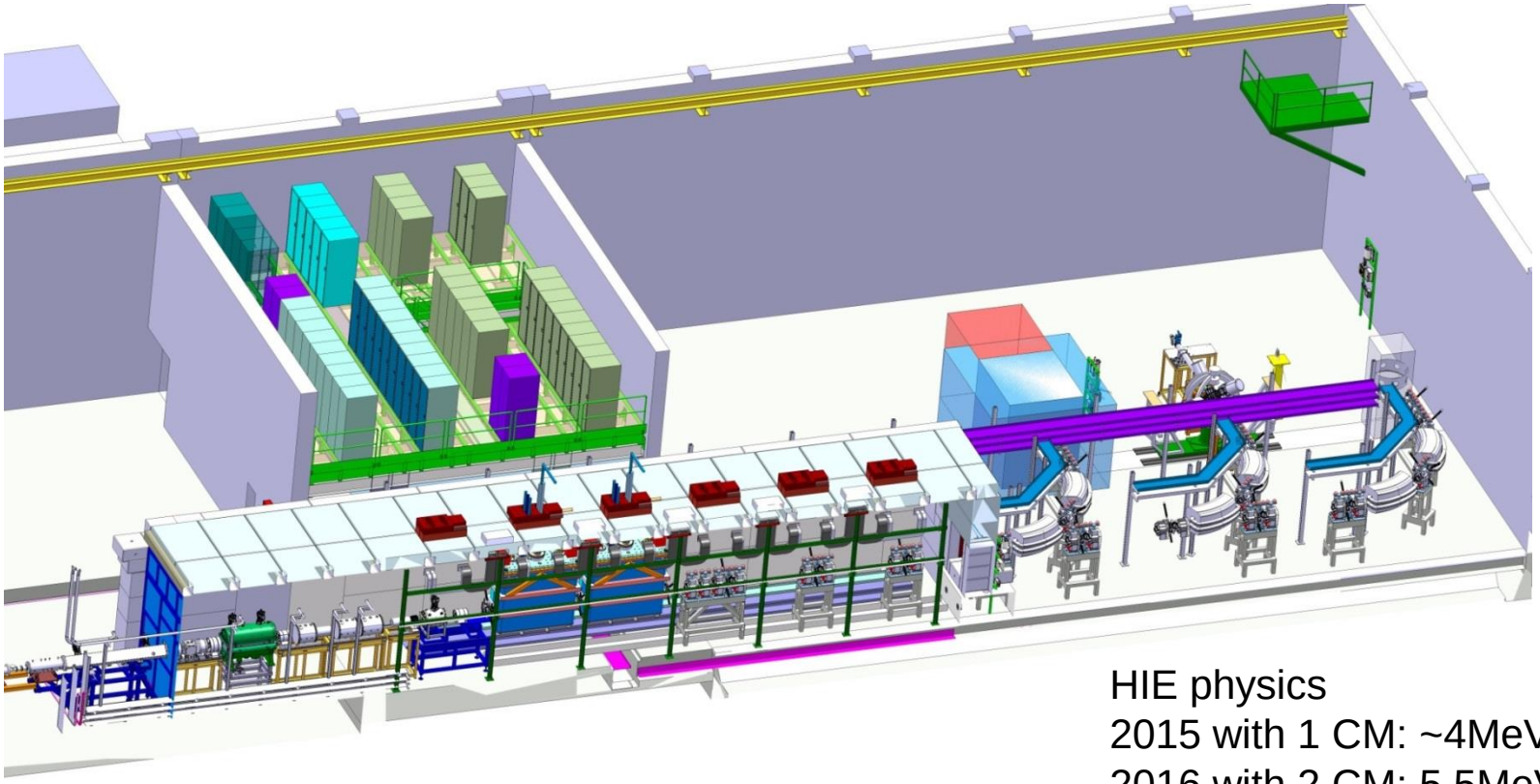
Outline

- **HIE Installation Progress:**
  - Stage 1 installation and planning
  - Progress since HIE workshop Dec. 2013
  - Ongoing activities
  - What to expect for this and next year
  - Construction and Physics in parallel: Safety

Stage 1 Installation

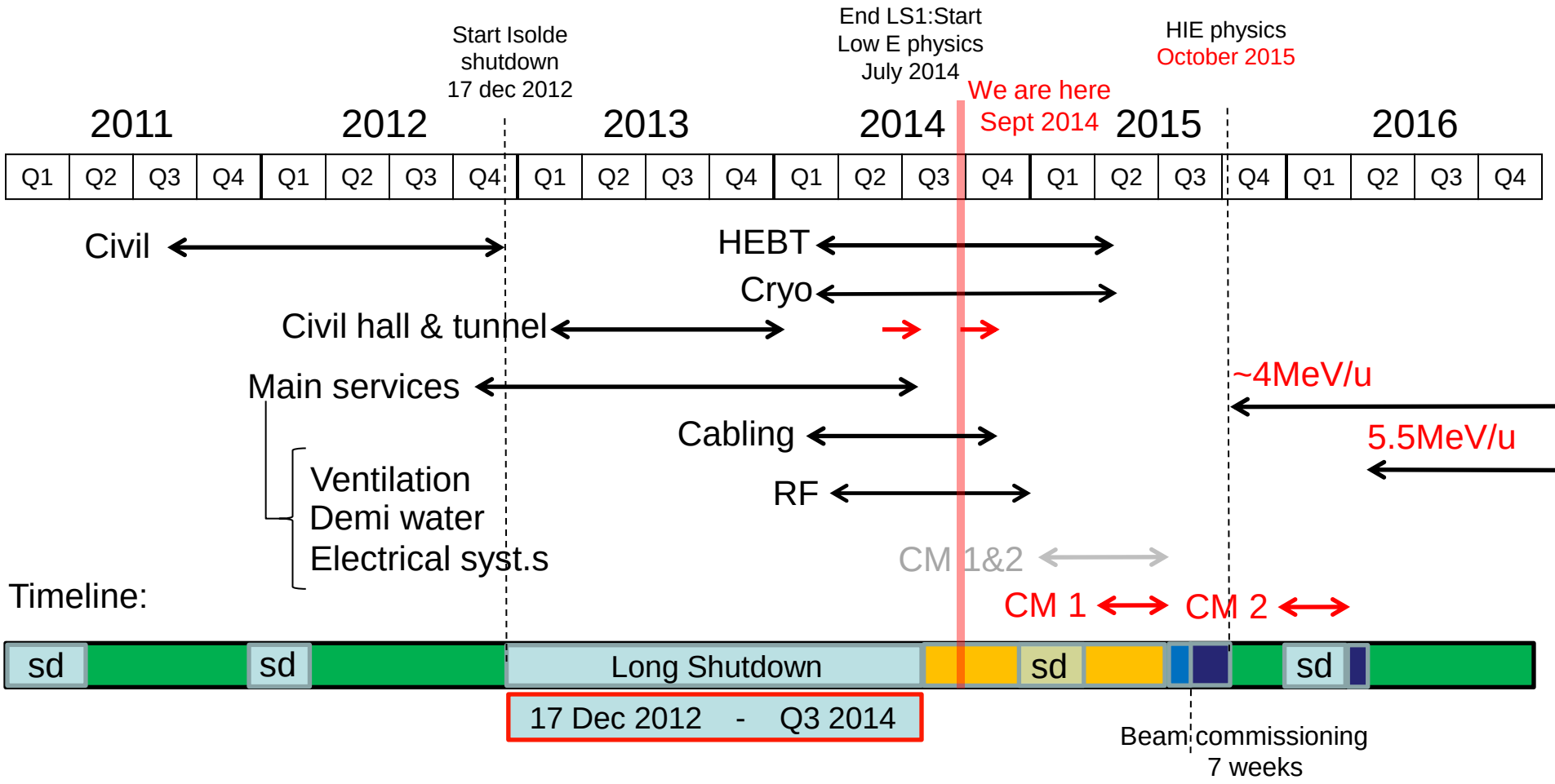
HIE stage 1:





HIE physics
2015 with 1 CM: ~4MeV/u
2016 with 2 CM: 5.5MeV/u

Stage 1 simplified Installation Planning



shutdown

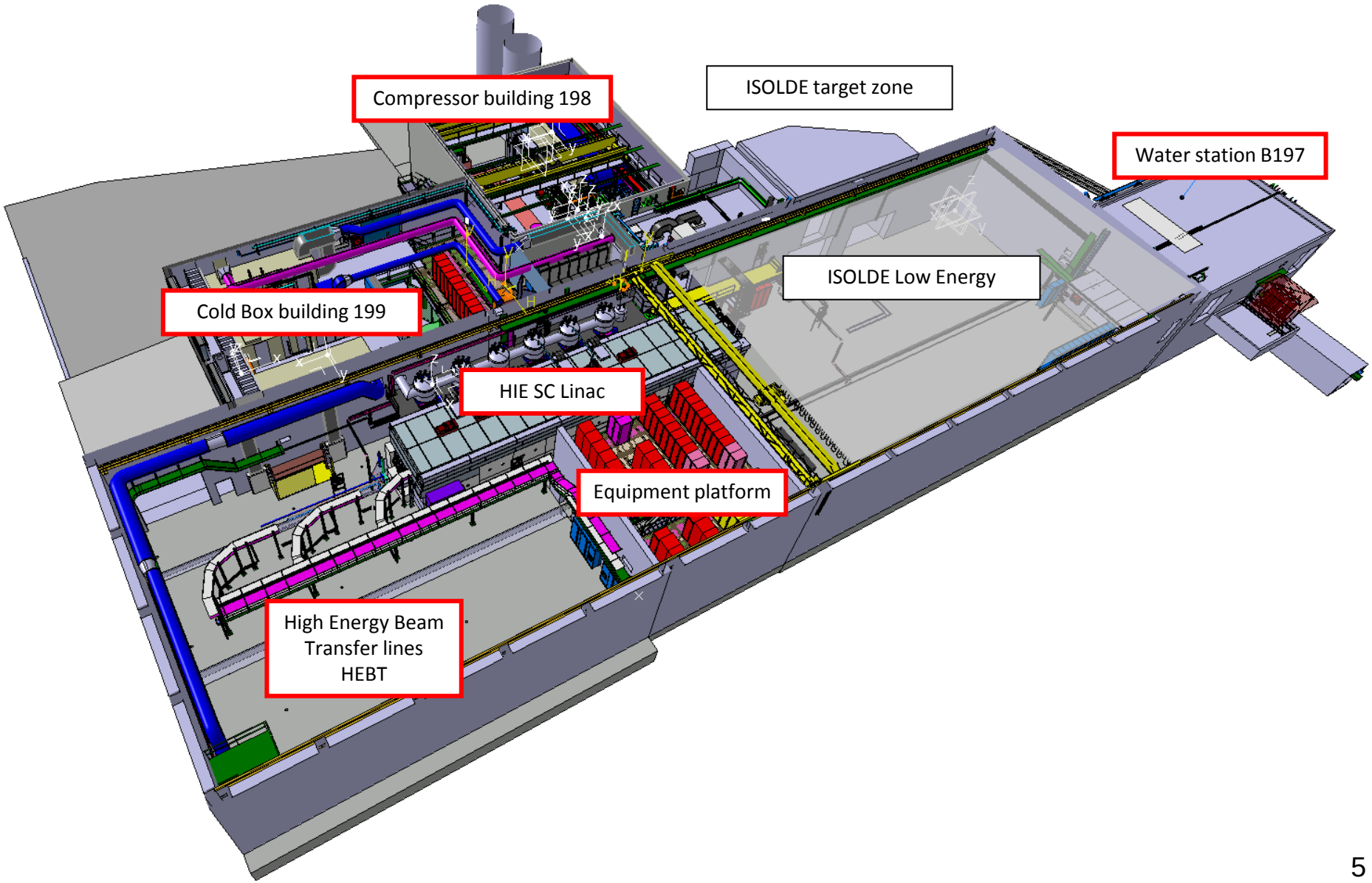
Isolde Ops

HIE installations and tests (Isolde normal operations)

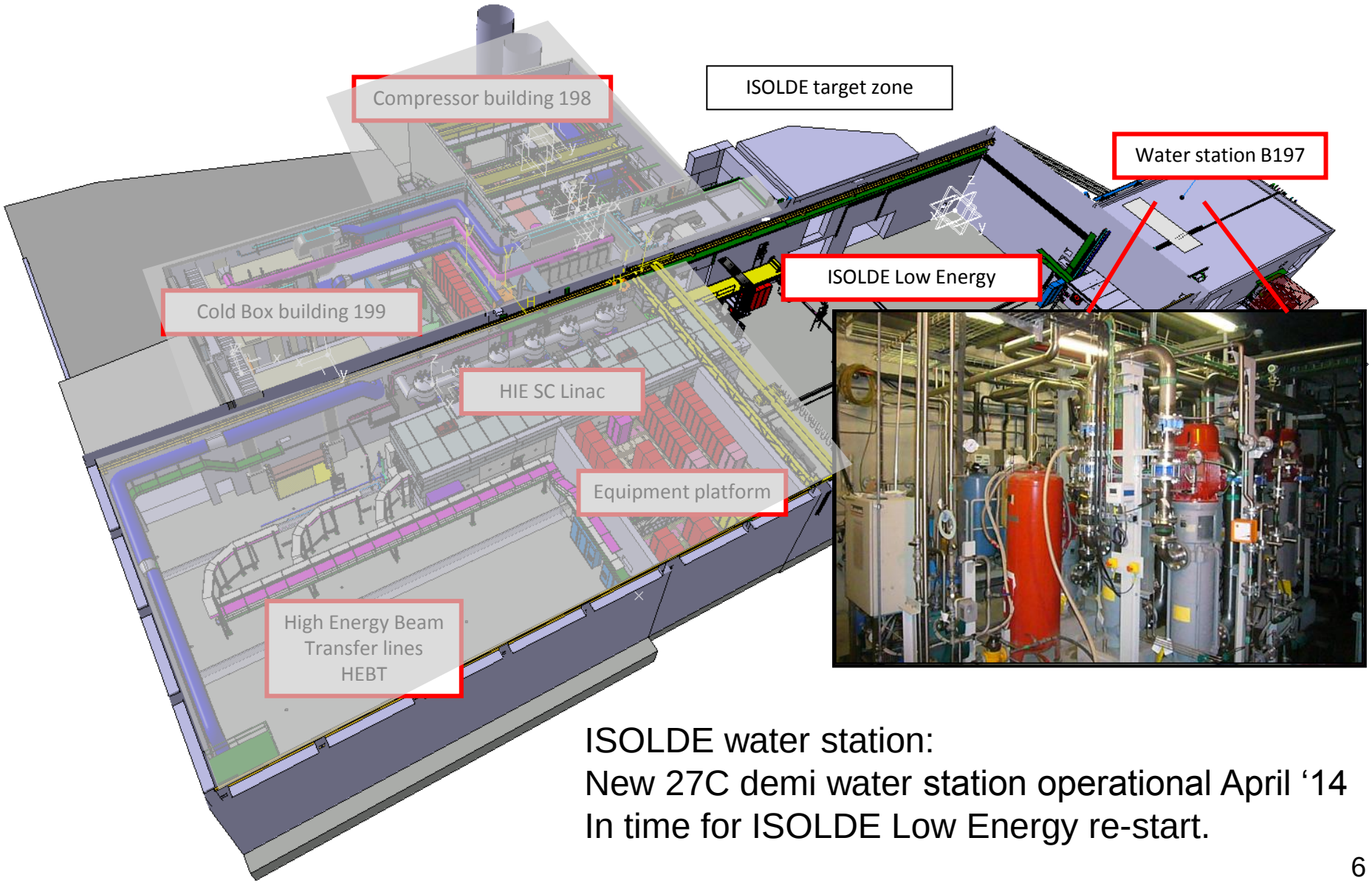
Machine Check-Out (Isolde normal operations)

Beam Commissioning (Isolde normal operations)

HIE Installation Progress

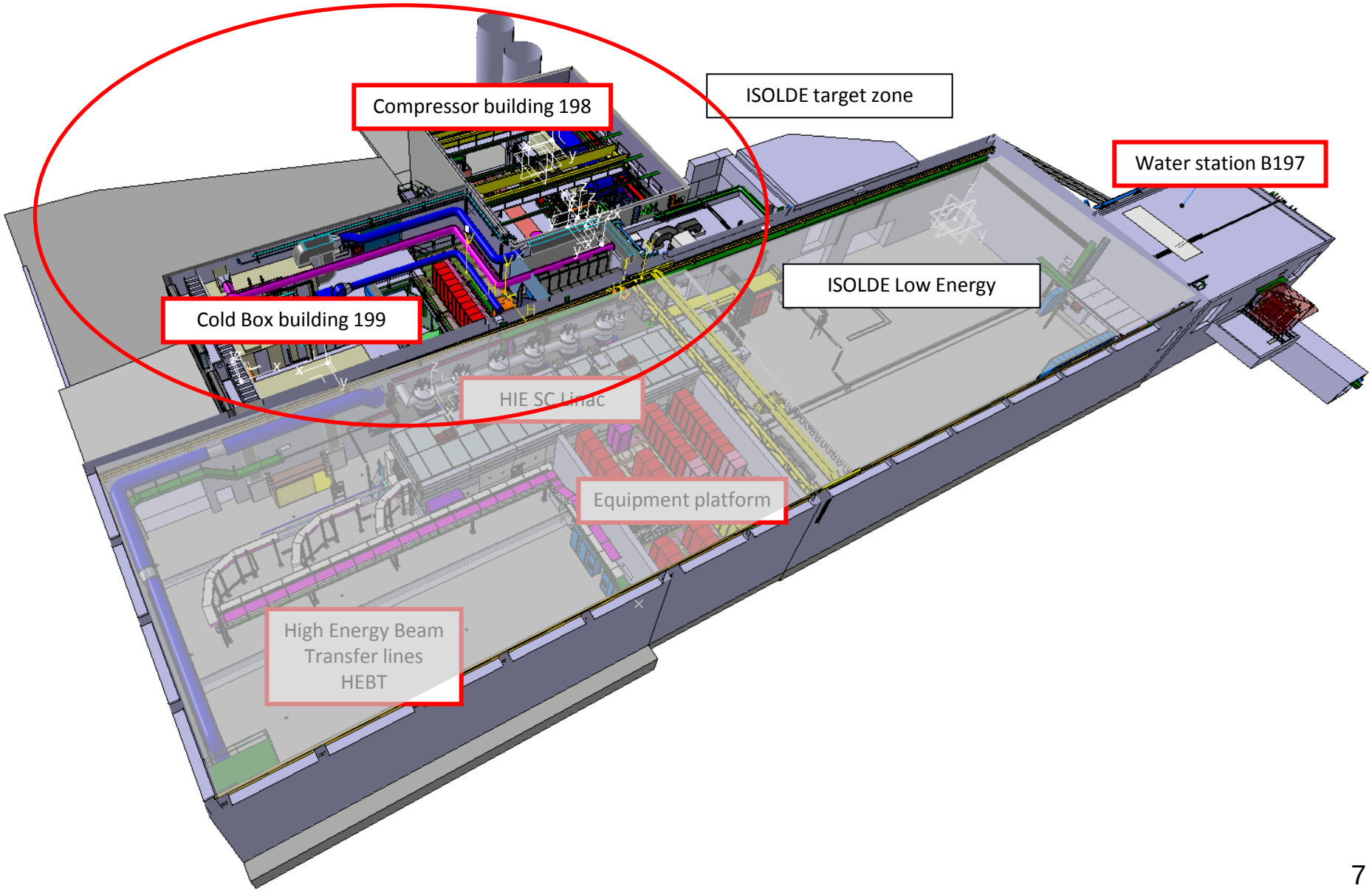


(HIE) ISOLDE water station

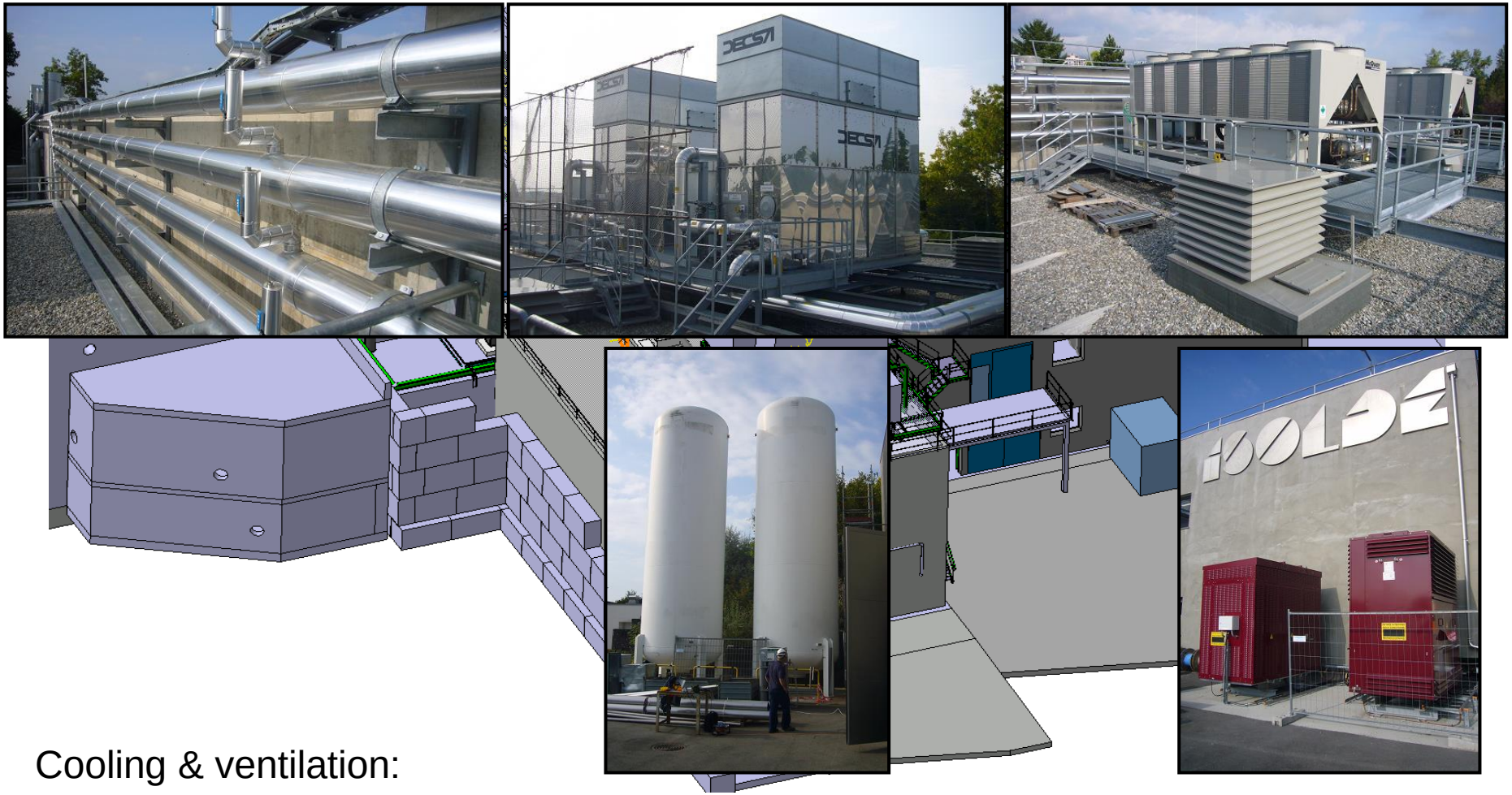


ISOLDE water station:
New 27C demi water station operational April ‘14
In time for ISOLDE Low Energy re-start.

HIE ISOLDE Service Buildings



Outdoor progress



Cooling & ventilation:
Tubing demi and chilled water installed and isolated. Cooling towers and chillers tested and operational.
Cryo: He buffer tanks installed.
EL systems: 400V and 3.3kV transformers installed and cabled.

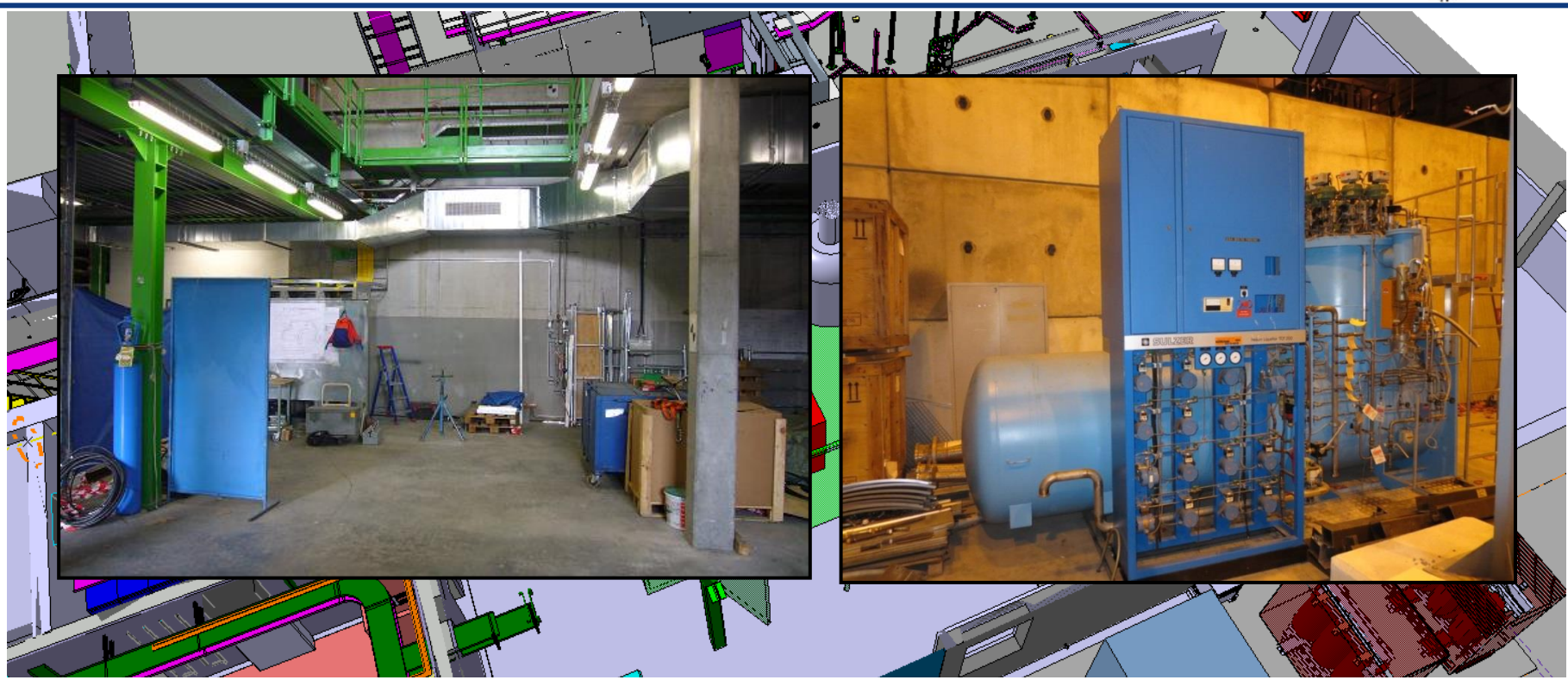
Compressor building 198

Cooling & Ventilation: Water and HVAC installations finished and systems operational. Acoustic tests for the building done.
Cryo System: Compressor frame and adsober in place. Cabling done. Piping ongoing. Refurbished ALEPH Compressors and new pump have arrived, ready for installation.

Cold Box building 199

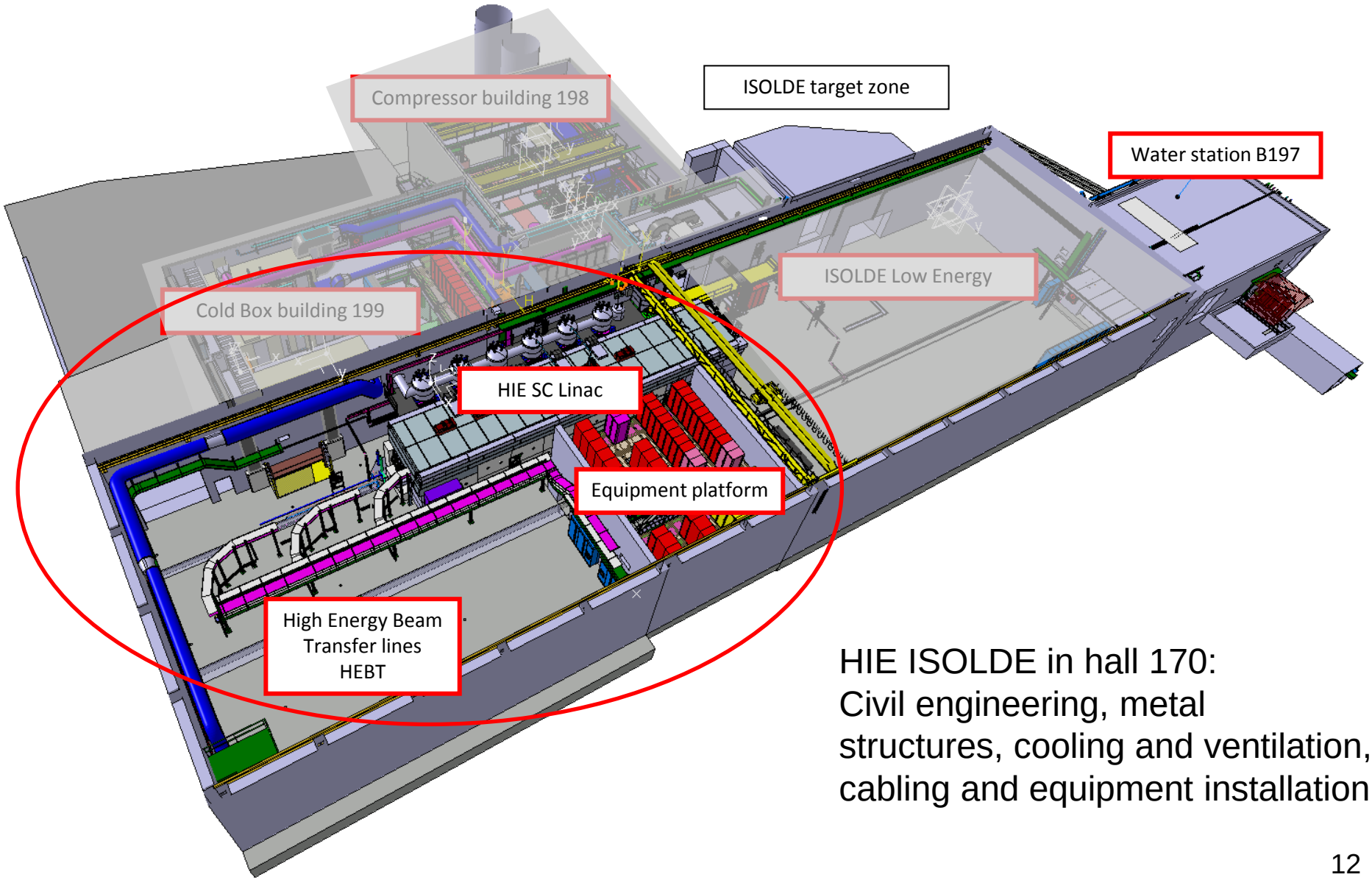
EL: 400V and 3.3kV distribution cabinets in place, cabling ongoing.
CV: HVAC systems in place and tested.
Safety: ODH and fire detection systems in place.
RF: LLRF, slow control and amplifier racks in place and being cabled.
Cryo: control racks in place. Cabling ongoing.
Ethernet: racks in place. Cabling ongoing.
EPC: Solenoid power supplies (2x) in place.

Cold Box building 199



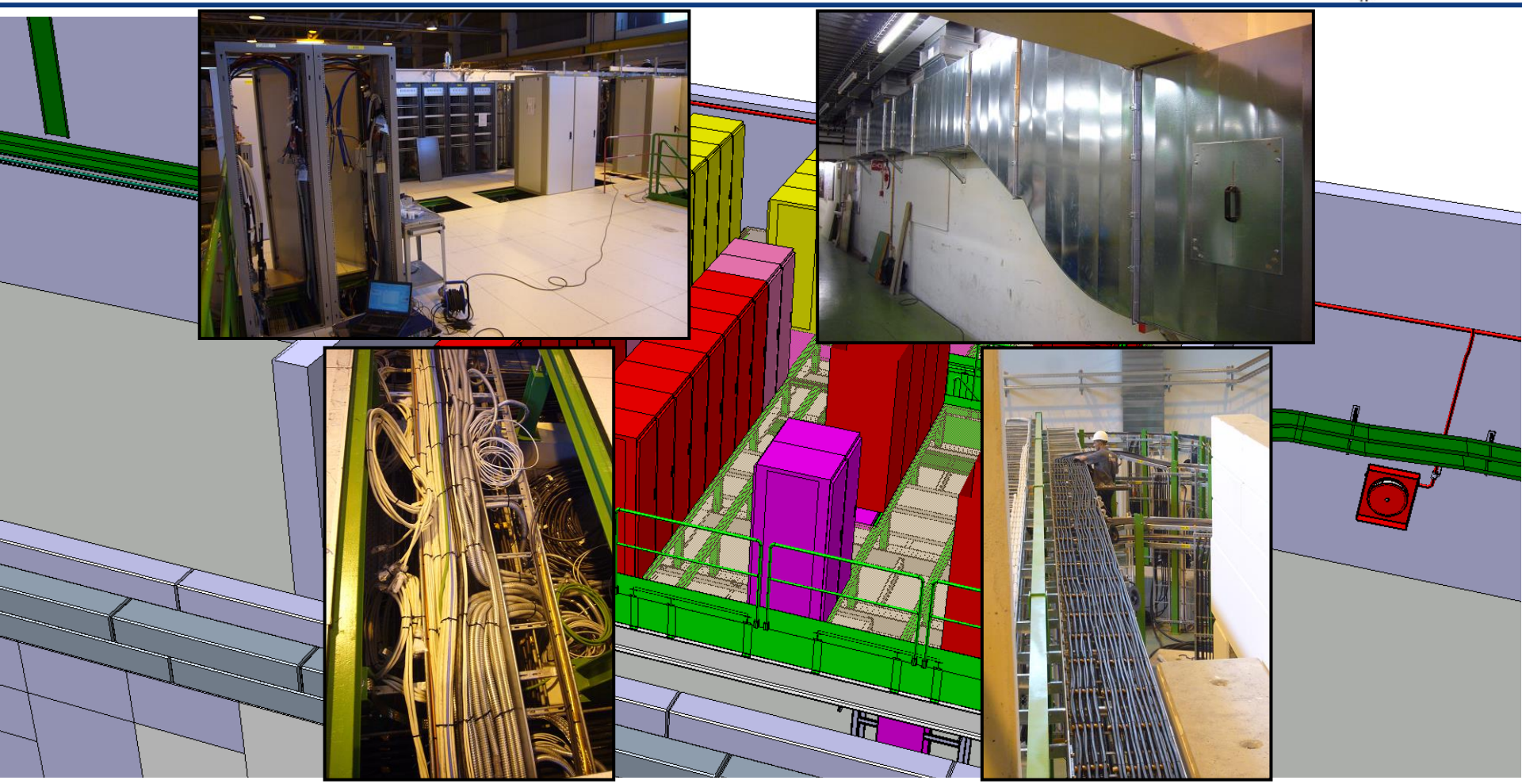
Cryo Cold Box: ex-ALEPH being refurbished at the contractor (LINDE)
Expecting back at CERN by the end of October.

ISOLDE hall 170



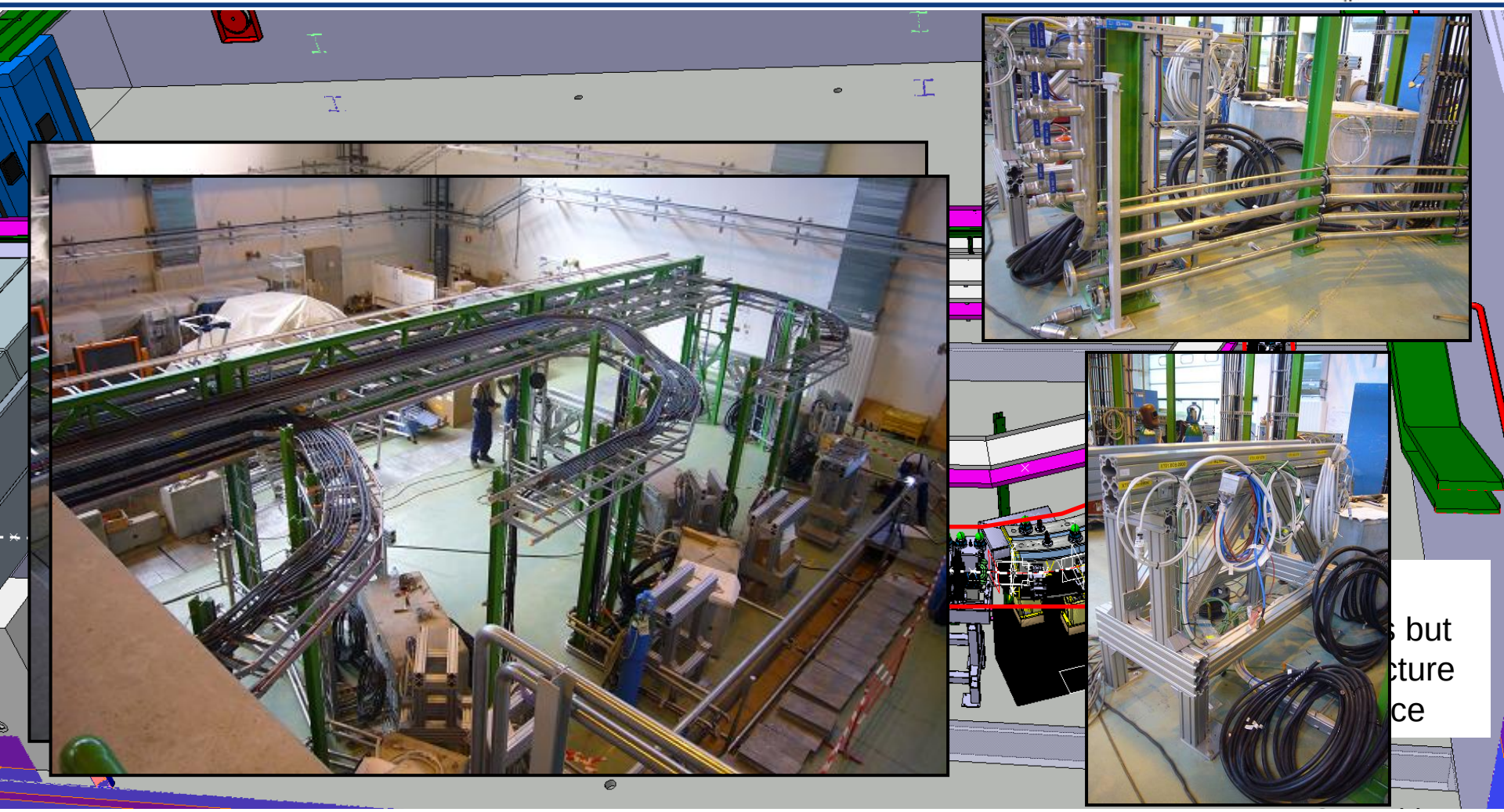
HIE ISOLDE in hall 170:
Civil engineering, metal structures, cooling and ventilation, cabling and equipment installation

Equipment platform



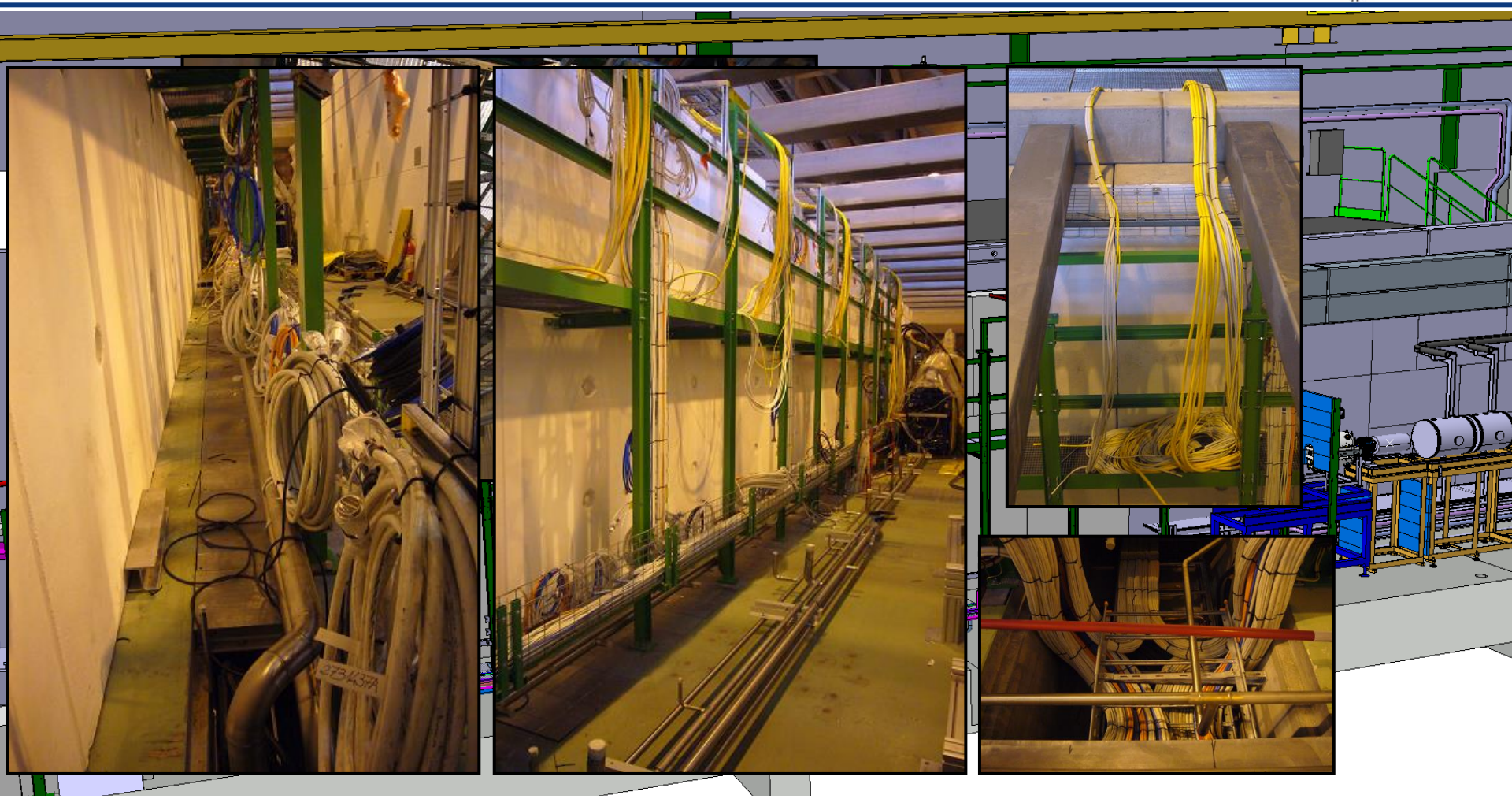
Rack platform:
Racks WIC, VAC and EPC (correctors) installed. Cable trays all in place. DC, vacuum, BI and interlock cabling to HEBT and machine done.
CV: Rack platform specific ventilation air ducts being installed.
AC cabling ongoing. Equipment (EPC, BI, WIC) to arrive as of end September.

HEBT infrastructure



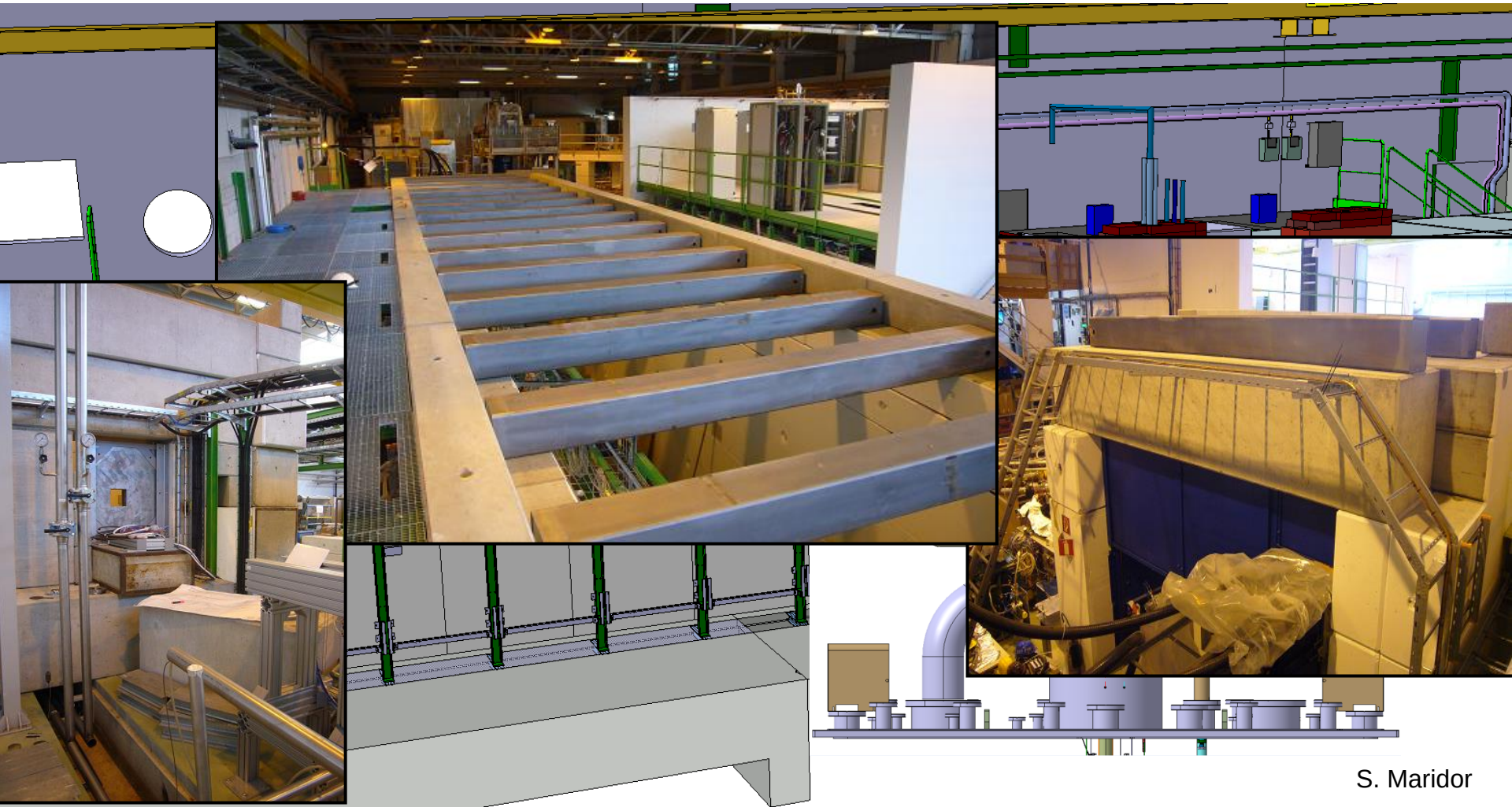
HEBT cable trays and cables installed (DC, vacuum, BI and interlocks).
Alu and concrete elements supports in place and shimmed.
Water cooling and vacuum infrastructure finishing. Support tables and dipole jacks Oct.
Followed by elements installation Oct. 2014 – Jan. 2015

Infrastructure HIE tunnel



Jumper boxes platform installed. Cable trays underneeth in place.
Cabling in- and outside tunnel largely finished. RF flexwell cables starting.
Tunnel vacuum and water infrastructure being finished.

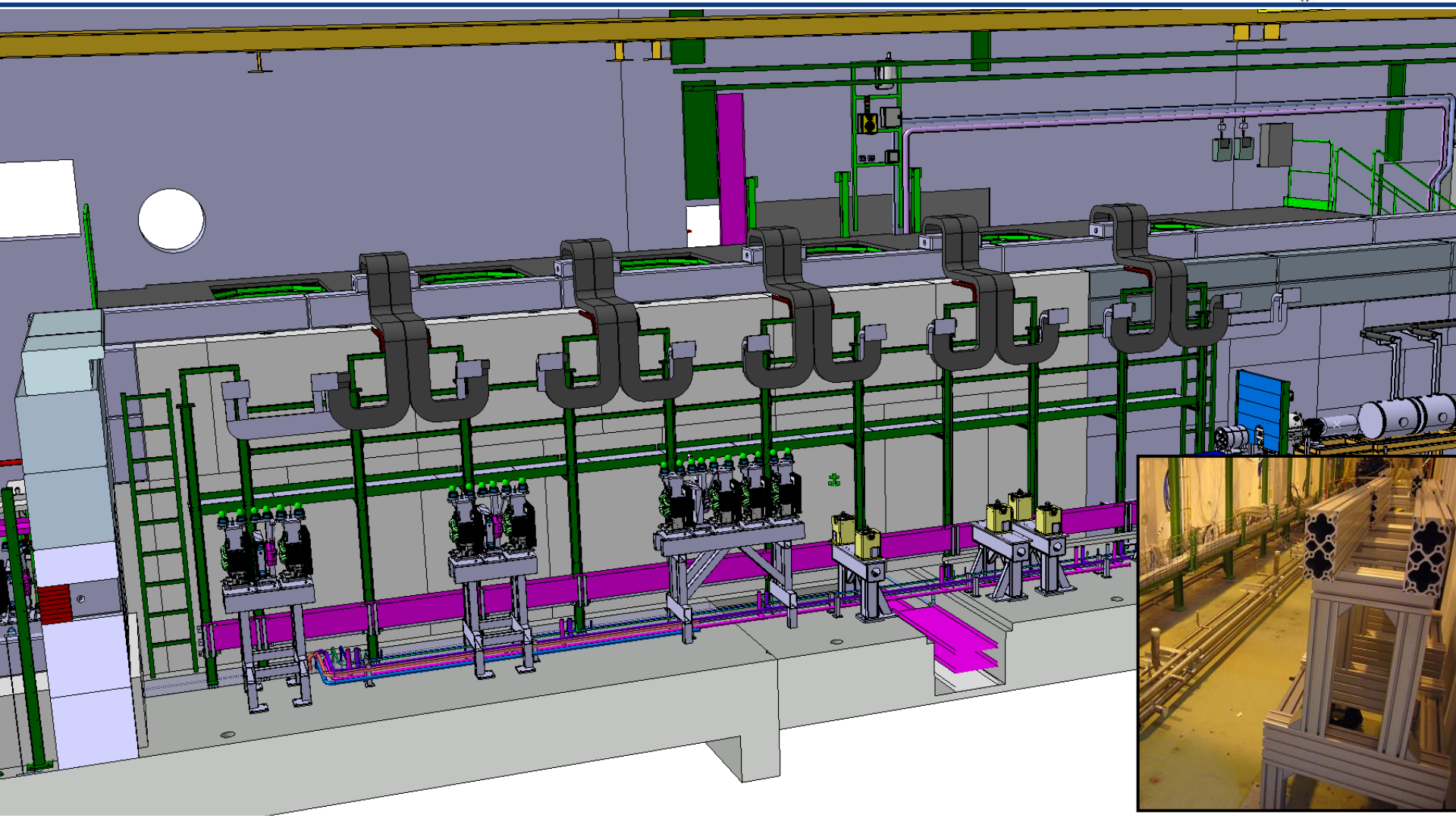
HIE shielding tunnel



S. Maridor

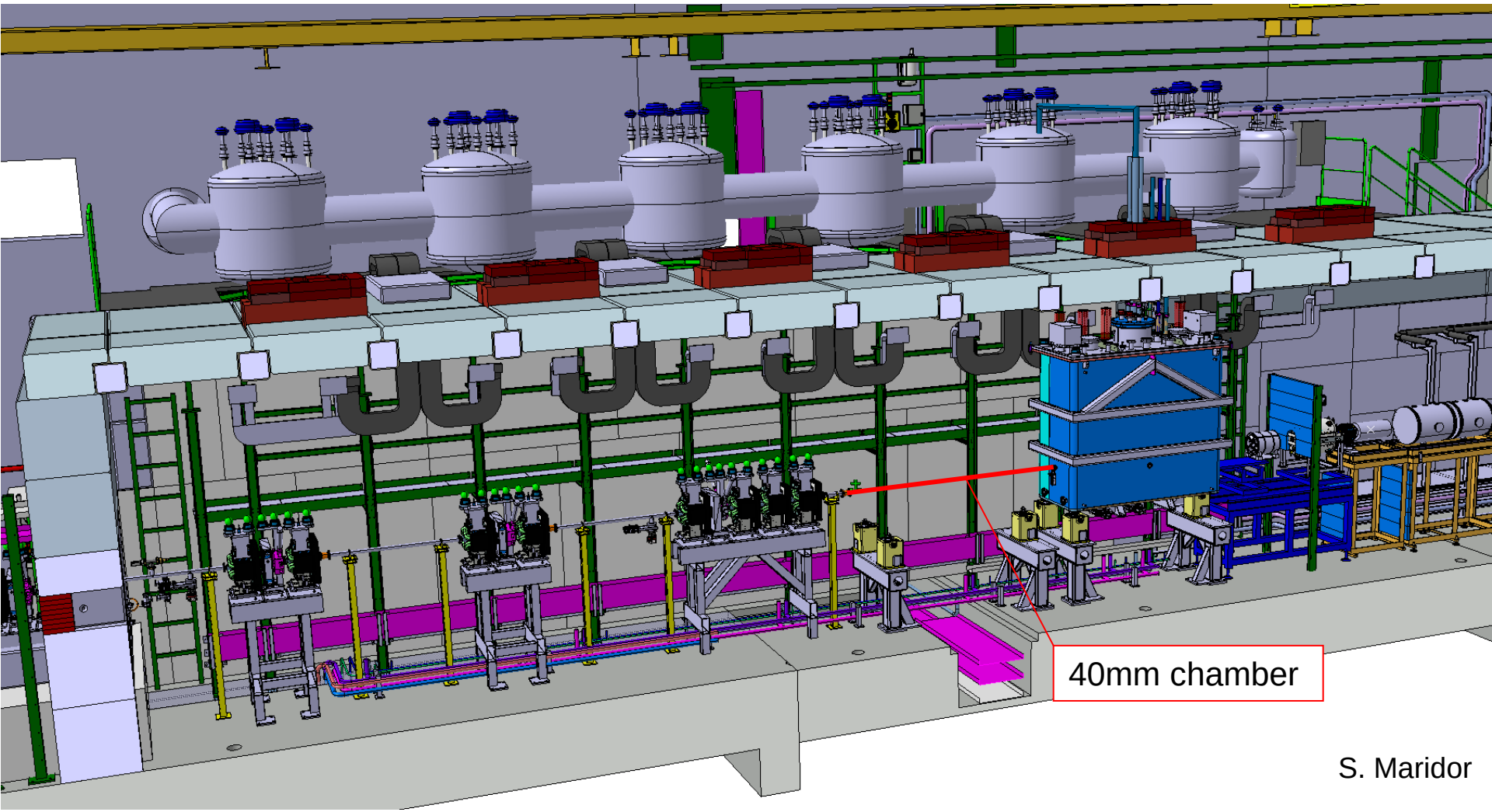
Chimney parts fabricated – ready for concrete filling.
Roof beams filled with concrete and installed.
Side- and end-walls solutions found and closed.
Awaiting concrete roof parts for fitting tests (end Sept)

HIE LINAC elements



Linac elements- & CM-supports in tunnel in place – by end September
RF flexwell cabling: Oct/Nov
Elements installation Oct. 2014 – Jan. 2015

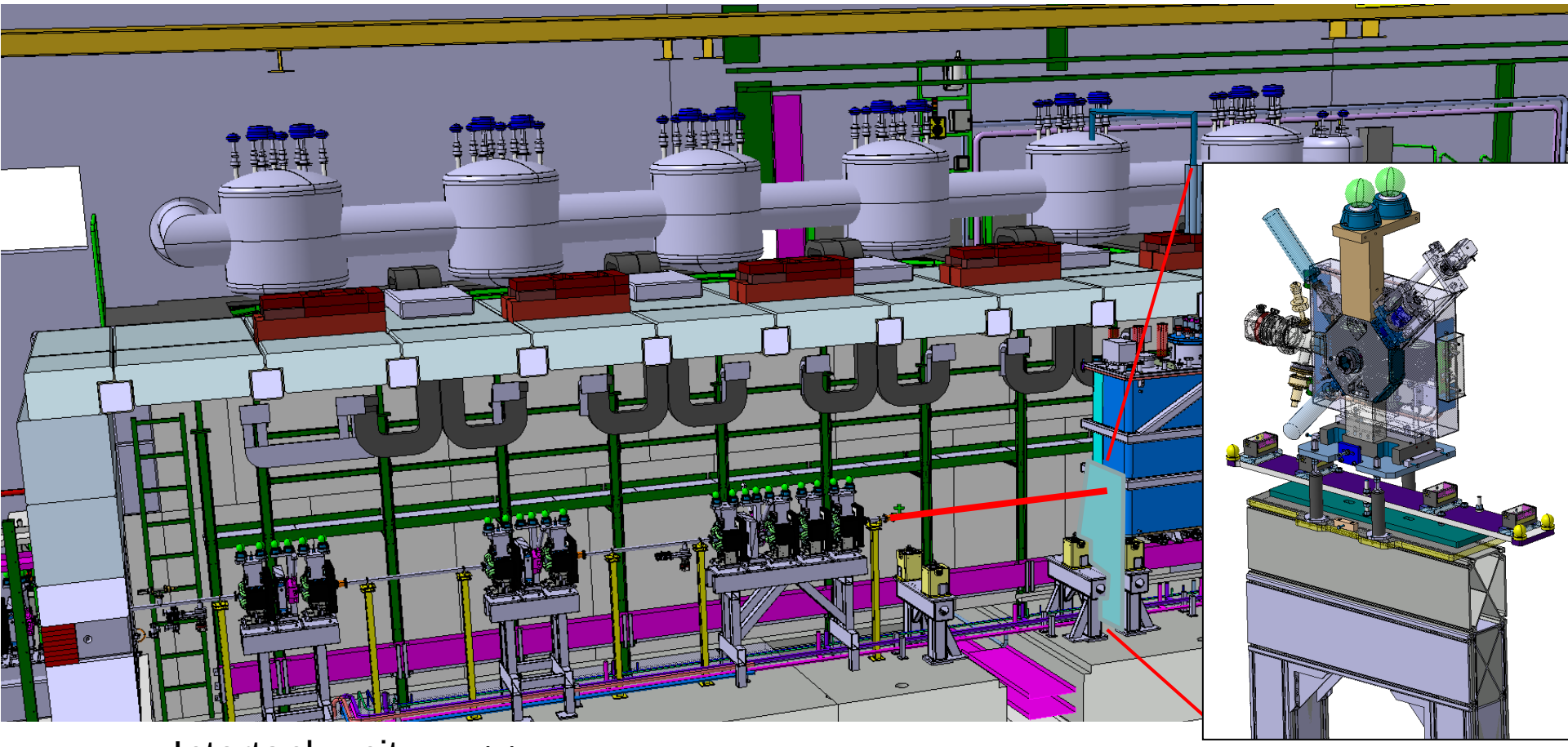
HIE LINAC elements



S. Maridor

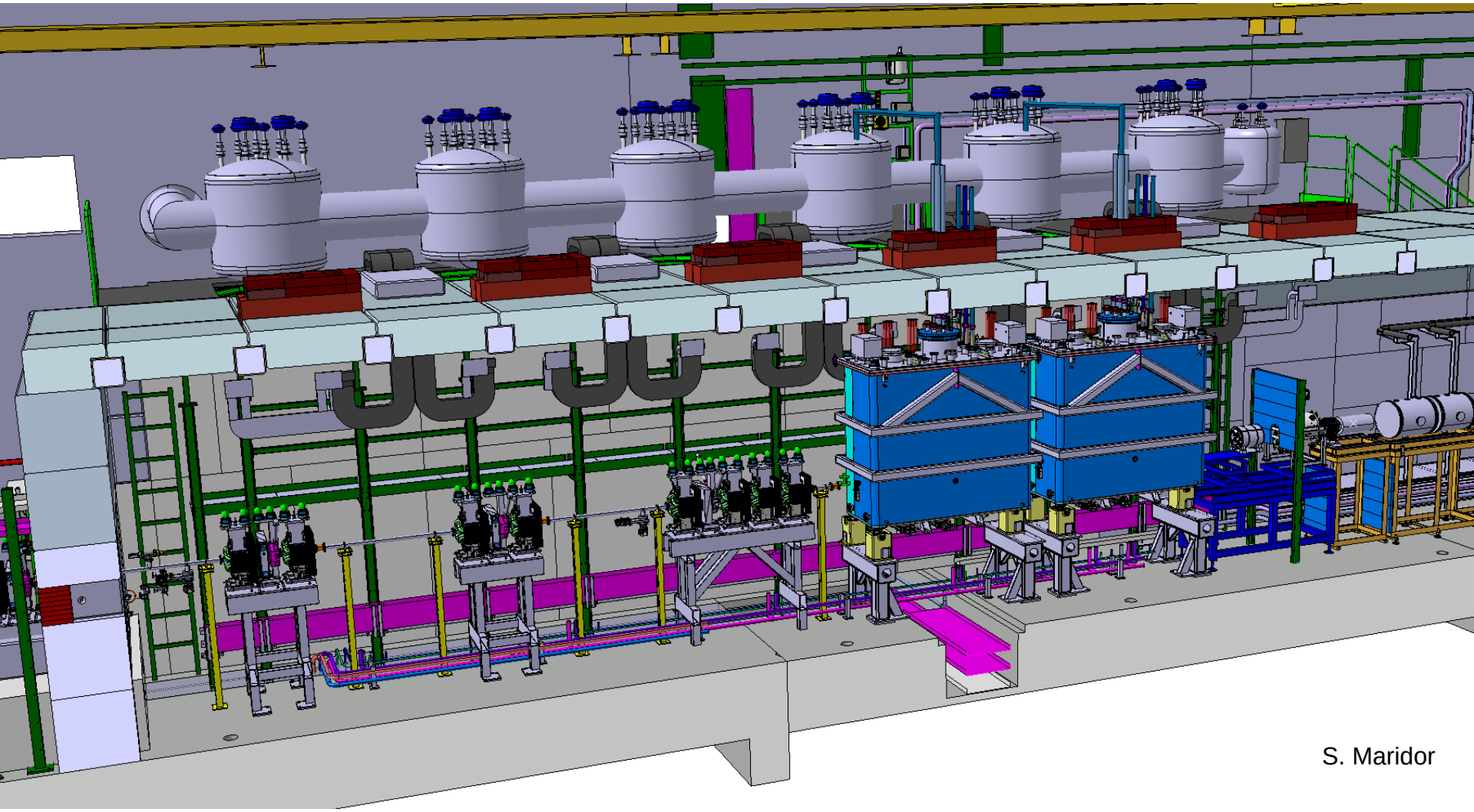
Cryo Cold Line & Jumper Boxes installation: Nov 2014 – Jan 2015
Cryo Module 1 installation: April – June 2015
Scenario: Physics at ~4MeV/u with 1 CM as of October 2015

HIE LINAC elements



Intertank unit containing:
Short diagnostic box
Corrector
BCAMs
Vacuum equipment
Supports, adjustment tables & lifting equipment
Installation after CM1: June 2015

HIE LINAC elements

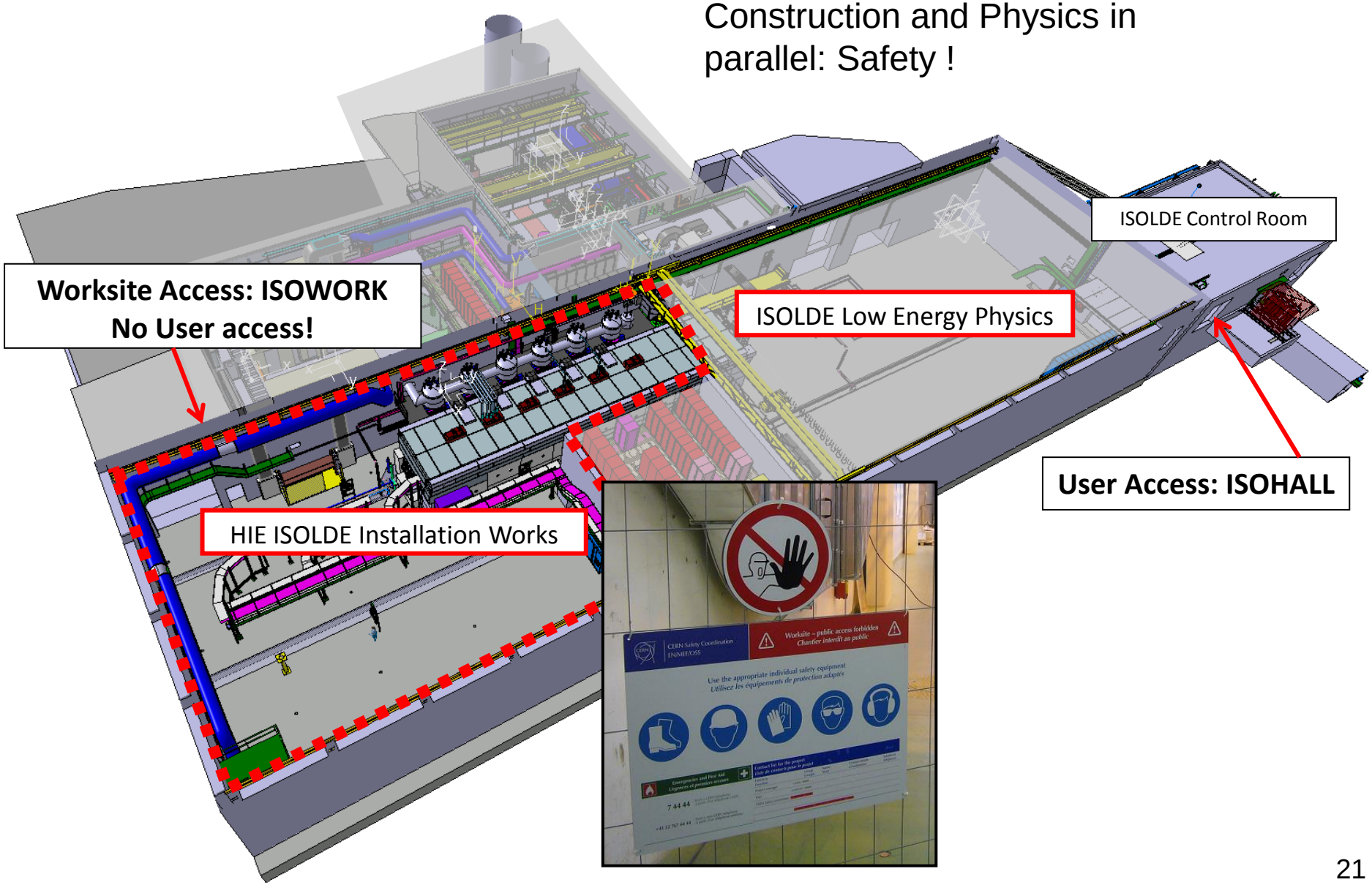


S. Maridor

Cryo Module 2 installation: Shutdown 2015/16: Jan – March 2016
(Stage 1 completed)
Scenario: 2nd commissioning at 5.5Mev/u with 2 CM‘s as of May 2016

ISOLDE hall 170: Safety

Construction and Physics in parallel: Safety !



Conclusions

- **HIE Installation Progress Sept 2014:**

  – Progress since the HIE workshop December 2013
  Installation has continued according to plan with a steady progress and minor delays

  – Ongoing activities and those to come
  High activity in the hall and service buildings will continue with finishing the infrastructure.
  The installation of the HEBT and Linac elements will start as of next month and the arrival of the first Cryo Module is planned for the second quarter of 2015 followed by the installation of the second Cryo Module during the shutdown 2015/16.
  Dense periods of hardware testing and commissioning of the new equipment and HIE Linac and HEBT lines are planned for the summer of 2015 with first HIE Physics expected in the Autumn of 2015.

  – Safety:
  Challenge: Construction of HIE ISOLDE with ISOLDE Low Energy Physics in parallel.
  Access: ISOLDE experimental hall divided into a working zone and experimental zone.
  Wear of safety equipment is adjusted accordingly.

Acknowledgement

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- TE/MPE : RICHARD MOMPO

Thank you for your attention

HIE RF systems status

RF systems

LLRF

- 10 LLRF controller cards produced and tested (April ’14)
- Procurement for another 15 launched
- Shielded racks installed in bldg. 199 (summer ‘14)
- RF cables, connectors, directional couplers purchased and delivered
- Coaxial cable installation campaign start mid September ‘14

Slow Control & RF interlocks

- Assembly & test of controls for 5 cavities in SM18 ready by Oct ‘14
- Assembly & test of controls for 2 Cryo Modules ready by Dec ’14

Air cooled Amplifiers (for SM18 bunker)

- All 6 delivered

Water cooled Amplifiers (for SC linac)

- First pre series by end March to be qualified at CERN.
- Delivery of the 12 remaining by Sept‘14

RF Installed and tested by Spring ’15

LLRF test stand

HIE vacuum status

Vacuum

Vacuum chambers Dipoles and circular chambers

- Design finished
- Production started for bending, order placed week 38 for all others
- Delivery as of Oct (Nov for the dipoles)

Vacuum components

- Standard CERN components (CERN contracts)
- Delivery completed

Installation Nov ‘14 - Jan ‘15

HIE EPC status

Power convertors

Dipoles – COMET_2p (a.k.a. S500) - CERN design and manufacturing (partial)

- 2 units installed by (mid) Nov ’14 (CERN assembly)
- Remaining 5 units produced first quarter 2015 (outsource schedule to be finalized)
- first 2 units (outsourced) installed by mid-Feb ’15 (estimated)

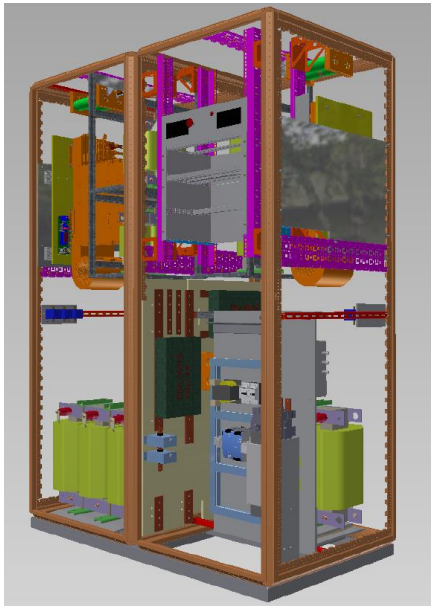
Quadrupoles – COBALT

- 3 units available by mid-Oct & installed by Nov ’14
- 21 series installed Jan ‘15 and 20 series March ‘15 (production rescheduled)

Hardware tests can be performed with the 3 available units

Correctors – CANCUN 50

- Full delivery of 34 units by (end) October ‘14 (need only 22 units for phase1)
- Installation first half finished by (end) October ’14 (hardware tests of all circuits can be performed with it)
- Second half finished (end) Nov ’14



S500 power convertor

HIE Magnet status

Magnets

All contracts placed; magnet manufacturing budget within estimates

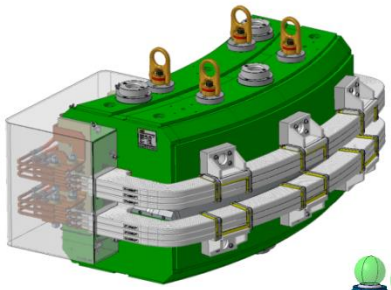
Production

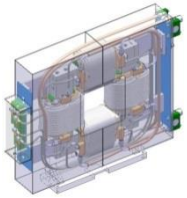
- *Dipoles*: 1 pre-series mid-September 2014, 3 series expected until December 2014 (magnets for XT00-XT01 delivered by November 2014)
- *Quadrupoles*: 1 pre-series delivered June 2014, 2 series delivered July 2014, 21 series expected until February 2014 (magnets for XT00-XT01 delivered by December 2014)
- *Correctors*: 1 pre-series delivered June 2014, 2 series delivered August 2014, 10 series expected until October 2014 (magnets for XT00-XT01 delivered by September 2014)

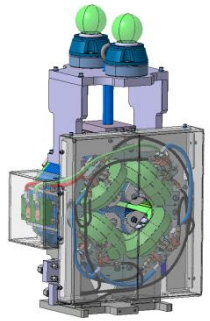
Magnetic measurements

- Acceptance tests to confirm manufacturing up to specifications
- More in depth characterization of the field on pre-series magnets for beam optics

Installation Oct ‘14 - Jan ‘15


HEBT dipole


corrector


quadrupole

HIE instrumentation status

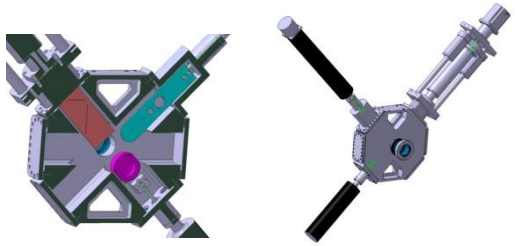
Instrumentation

Two types of diag. boxes: Short (SC Linac) and Long (HEBT)

Long boxes for the HEBT

- To be ready for installation Nov ‘14 (see talk Esteban Cantero)

Installation Nov – Dec ‘14 (XT01), Dec ‘14 – Feb ‘15 (XT02)



HIE (short) diagnostic box

Instrumentation Electronics

Diag. box control

- Received and tested (20 units) by October 14
- Installed by Dec ’14

Energy and bunch length (PIPS detectors)

- Two options considered for the electronics
- Not mandatory for operation

Control Software ready by Oct ‘14