



**Serge PITTET**

CERN, *for* LIU – PSB, 22 March 2016

# **EPC Planning for EYETS**

All power converters shall be ready by the end of 2016 in case of Linac4 emergency connection.

What can already be installed during the EYETS?

- Without major changes during the connection.
- Without leading to overwork on services.
- With a real gain in term of commissioning.

More details on workunits:

[http://te-epc-lpc.web.cern.ch/te-epc-lpc/machines/liu-booster/booster\\_injection.stm](http://te-epc-lpc.web.cern.ch/te-epc-lpc/machines/liu-booster/booster_injection.stm)

<ul style="list-style-type: none"><li>Septa converters</li><li>Stripping Foil Chitane converters</li><li>Ostrip converters for chitane compensation</li><li>Control Electronics</li><li>Control Software</li><li>Septa and Chitane Current Measurement</li><li>BI BIT Powering</li></ul>	<ul style="list-style-type: none"><li>Corrector Powering</li><li>Quadrupole Powering</li><li>Shavers Powering</li><li>Correction Dipoles</li><li>Multipoles</li><li>Unused converters</li></ul>
<b>Project Follow-up</b> <ul style="list-style-type: none"><li>Beam Interlock Specifications for Linac4, transfer lines and PS booster with Linac4</li><li>Booster Injection Equipment List</li><li>Power converter and magnet combinations</li><li>TE-EPC Projects Meeting<ul style="list-style-type: none"><li>6 March 2015 - EPC Booster Injection review</li><li>2 October 2015 - EPC Booster Injection review</li></ul></li><li>LIU Weekly Meetings<ul style="list-style-type: none"><li>22 March 2016 - EPC activities during the EYETS</li></ul></li></ul>	
<b>Booster Injection Septa converters development &amp; procurement</b>	
<b>LIU-PSB 5.1 91565</b>	<b>Workunit holder:</b> Jean-Marc Cravero <b>Budget Code:</b> 68734 <b>Due date:</b> January 2017
<b>Circuits</b>	BI1.RSMV10, BI2.RSMV10, BI4.RSMV10
<b>Deliverables</b>	3+1 MegaDiscap Converters
<b>Documentation</b>	<ul style="list-style-type: none"><li>Functional specification</li><li>Vertical Distribution Septum BI.SMV</li><li>Beam Interlock System</li></ul>
<b>Installation data</b>	<ul style="list-style-type: none"><li>4 racks</li><li>Width: 1150mm, Depth: 1000mm, Height: xmm, Weight: xkg</li><li>converter already installed, transformer and cables to be installed</li></ul>

## Functional specification

- under approval ([EDMS 1541748](#))
  - discussions still ongoing concerning the BIS triggering...

## Power converters status

- Power part: installed in the BCER room. **done**
- Electronic crate: prototype ready - **to be tested and validated.**
- Pulse transformer: prototype received - **to be validated.**
- Strip-lines/Supports: **prototype under testing – final design ongoing for production.**



## What can be done during the EYETS

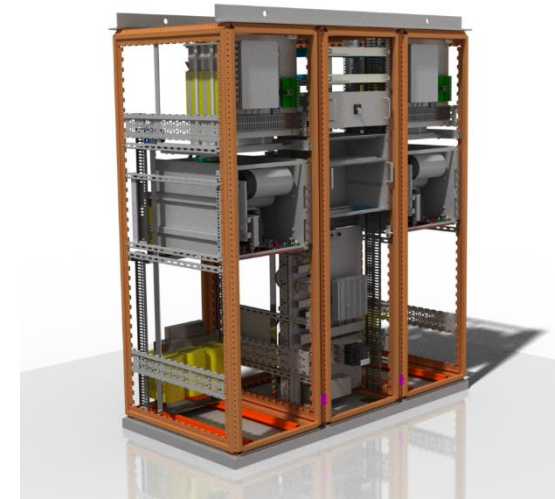
- **Not much!**

## Functional specification

- Approved

## Power converters status

- 3 x prototypes being manufactured
- All components for series production ordered
- Pulse transformers mechanical integration
  - HST in L4 ok – Ch. Coupat will validate with MEF
  - New location to be foreseen instead of the alcove (alveole) to locate pulse transformers – Ch. Coupat is following this. Civil Eng. needed.
- Contract award for series manufacturing in Norway next week



Prototypes being mounted in 866

## What can be done during the EYETS

- TBC : 361 civil engineering near alcove (alvéole) + Pulse transformers installation
- Pulling all cables to the PSB tunnel + Ethernet & DCCT cables
- Installation of all the converters in BRF2 (structure ready)
- Water cooling & WIC connection

## Required services

- Transport & installation of pulse transformers (Ch. Coupat)
- Installation & connection to water cooling equipment
- EN/EL has to pull all AC & DC cables & install Elect. distrib.

## Functional specification

- Approved (EDMS [PSB-R-ES-0004](#))

## Power converters status

- Delivered at CERN (18 units)
- Reception tests ongoing
- Regulation under development (FGC3)
- Upgrade under development (CANCUN 100)



## Converter racks

- Delivered at CERN (4 units)

## What can be done during the EYETS

- Removal of existing converters
- Cabling of periods 3 and 14.
- Installation and commissioning of the new converters

## Required services

- Integration
- Supporting structure
- DC, AC, ethernet cabling.
- Starpoint, control rack.

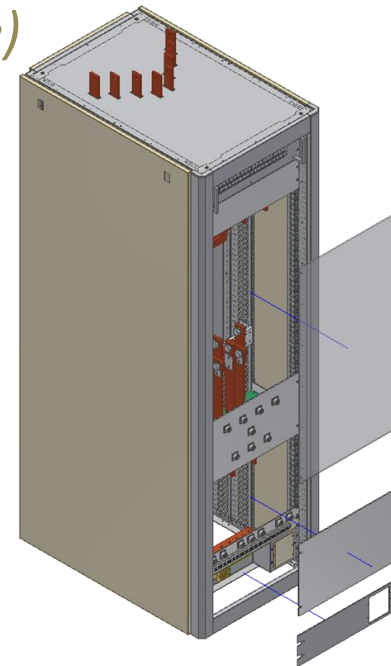
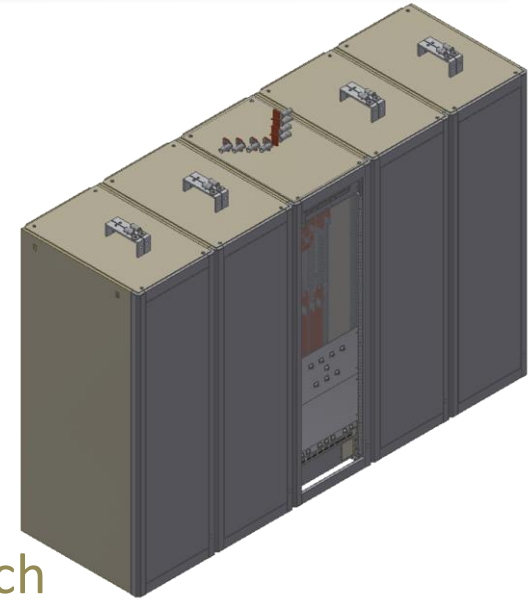


## Functional specification

- Approved (EDMS [PSB-R-ES-0003](#))

## Power converters status

- **Power Converters & Ctrl (Yves Thurel):**
  - 3 of 4 Power Racks available in bldg 287
  - Power Modules under manufacturing PowerTech  
*(All orders passed, company “seems” not very reactive)*
  - Ctrl items (chassis, cards) under production, DCCT ok.
- **Patch Panel (Edwin Rohrich):**
  - Design approved (indico N° [464400](#)).
  - Currently in purchasing phase
  - Manufacturing phase > June 2016.



## What can be done during the EYETS?

- Installing the whole power system (converter + patch panel), since installation does not require to remove existing items.
- Commissioning possible, **if magnet coils (present or new ones) are decoupled** (only decoupled magnet coils scheme is compatible with the proposed powering solution: 3 individual converters of  $40V_{\max}$ )

## Required services:

- DC, AC, ethernet cabling.
- Gateways, starpoints, ctrl racks.
- Cooling.

## Functional specification

- In Approval process for PSB inj.
- to be done for 2GeV



## Power converters status

- PSB inj.: 24+2 units in manufacturing process
- PSB 2Gev: 35+4 units in manufacturing process
- All racks ordered (arrived but all in bad conditions...)
- All electronics ordered (26 in 2015 – all received + 39 in 2016)

## What can be done during the EYETS

- General strategy to be confirmed. All installed during EYETS?
- If all installed during EYETS:
  - Implications in others WUs (all MaxiDisCap – Mechanical integration)
  - This implies that all reg.FGC3 electronics is ready and tested by October 2016! We have to tests all power chassis before!

## Required services

- EN-EL for AC/DC cables + canalis
- New false floor structure + installation – Ch. Coupat
- Ethernet
- TBC if WIC is necessary (approval Func. Spec.)

## Functional specification

- To be done

## Power converters status

- Components for modification of Maxidiscap V2 to V3 ordered and partly received.
- Electronics
  - CCE part partly delivered
  - FPC part currently being ordered (global order with ACC-CONS)
- Rack equipment material is currently being ordered.

## What can be done during the EYETS

- Supporting structure.
- Power converters only if the new magnets and the WIC are also installed.

## Required services

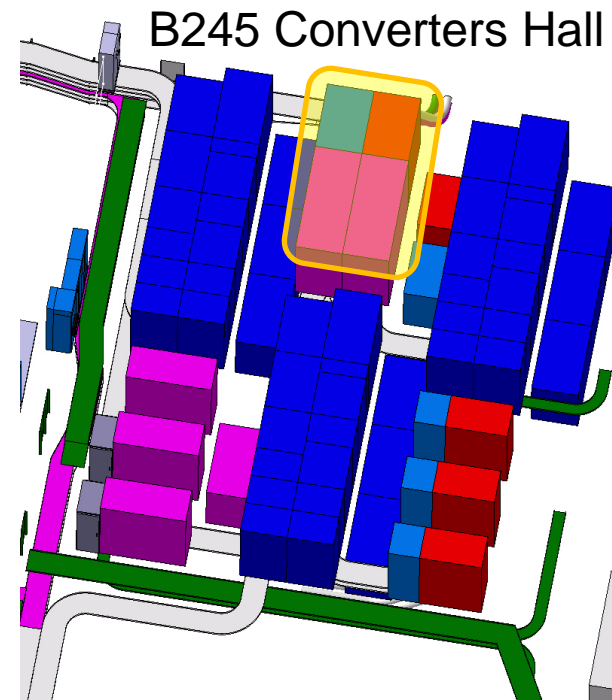
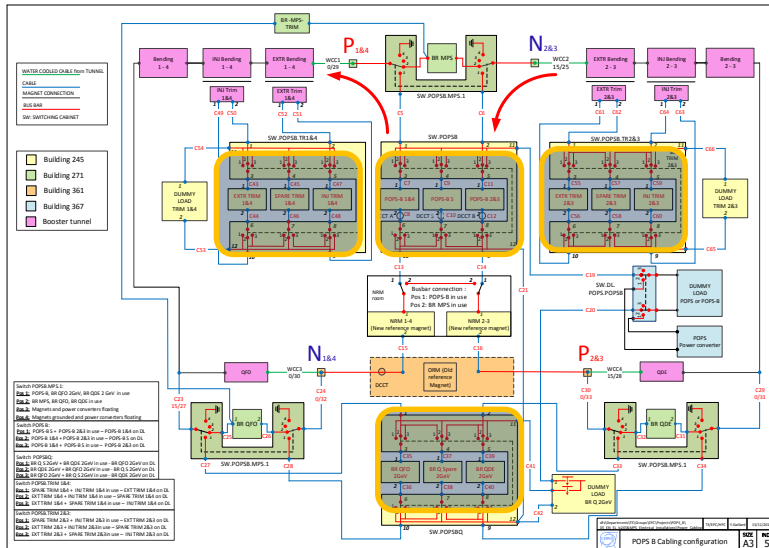
- Integration.
- Supporting structure.
- DC, AC, ethernet cabling.
- WIC cabling.
- Gateways, starpoints, control racks.

## B245: installation of MPS configuration switch (Nov 2016)

- The switches will allow the configuration of the new MPS;
- They will be installed in the B245.

### Required services

- Handling EN-HE-HH

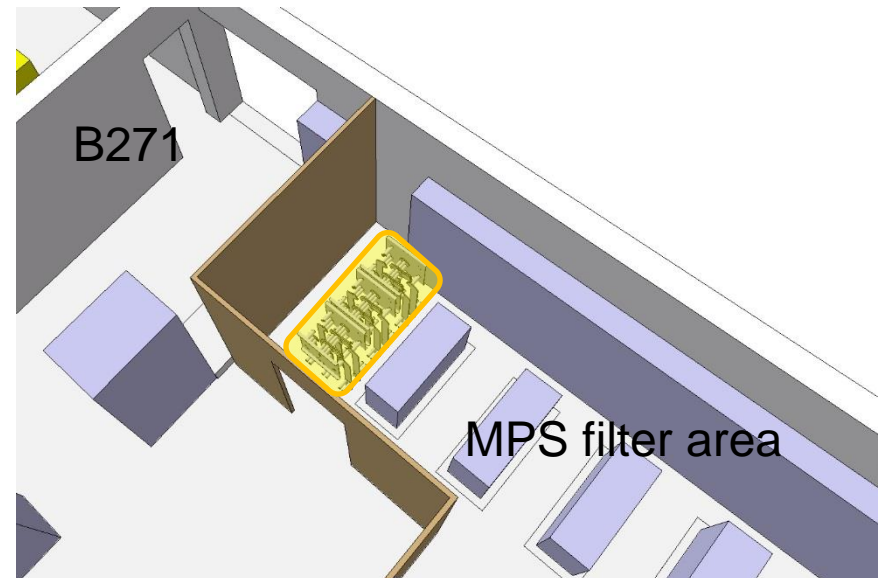
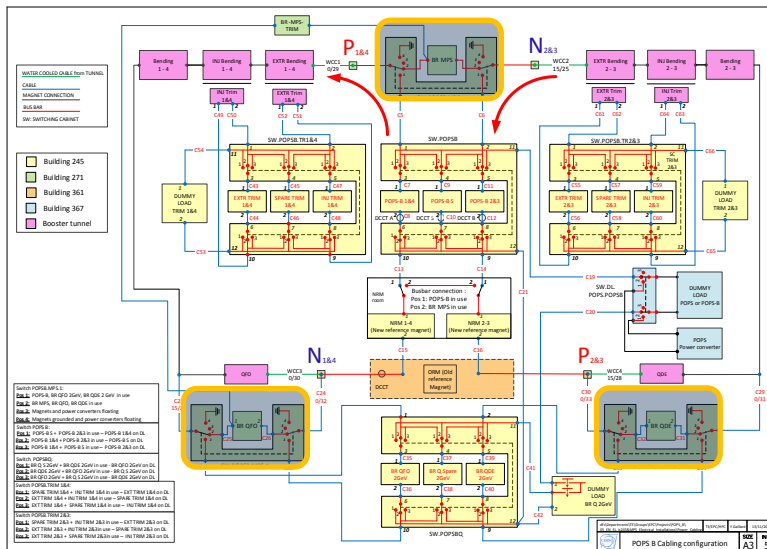


## B271: installation of MPS selection switch (Jan 2017)

- The switch will allow the selection of either the old or new MPS;
- It will be installed in the present MPS output filter area.

## Required services

- Handling EN-HE-HH



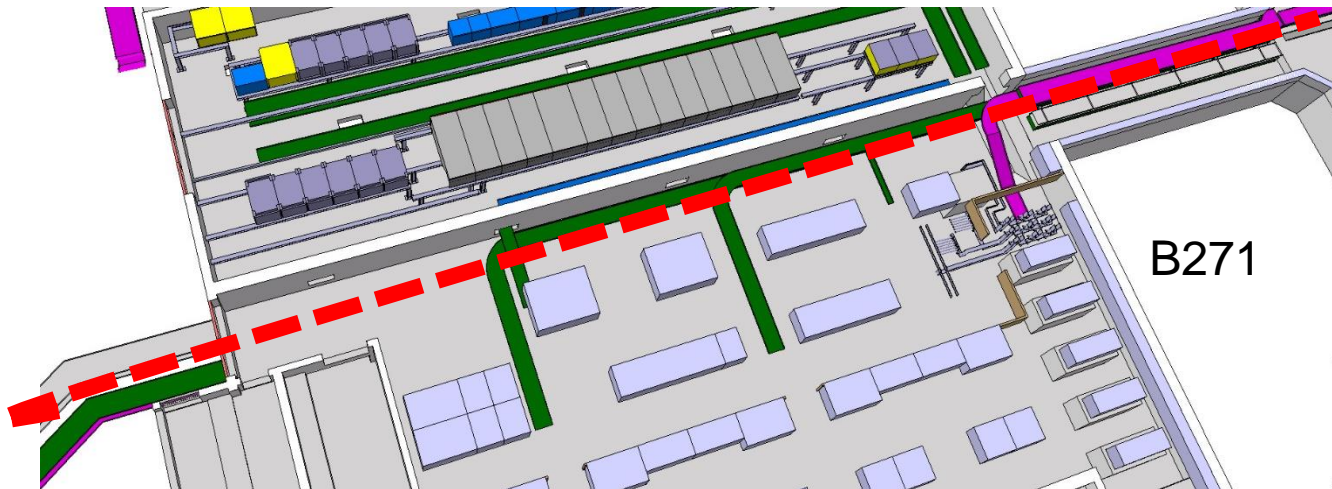
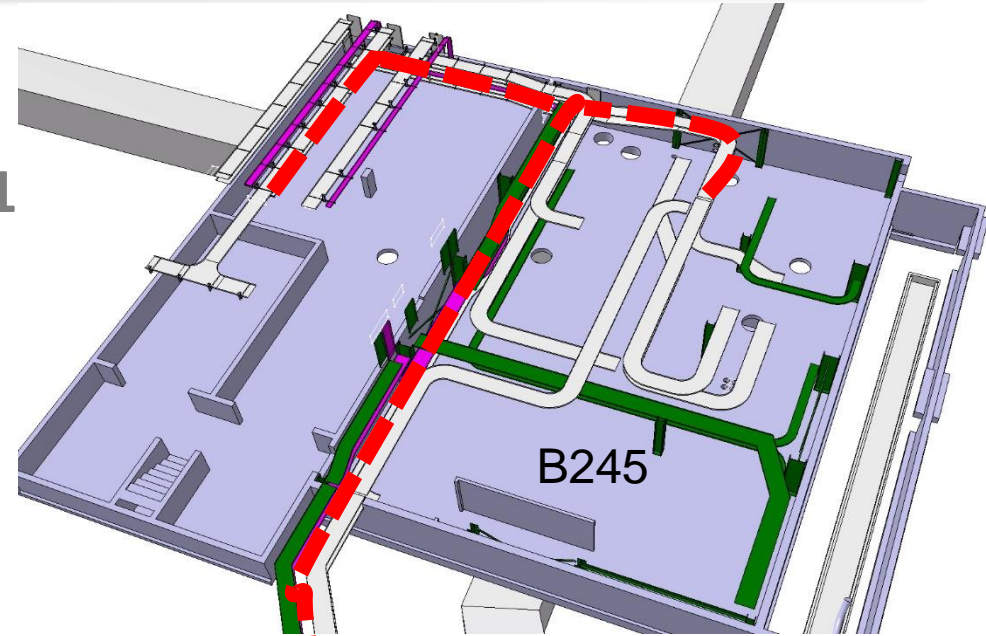


## Power cabling EYETS

- Cabling between B245 and B271

## Required services

- Cabling EN-EL-FC
- Cable ladders EN-EL-ENP



## What shall be done:

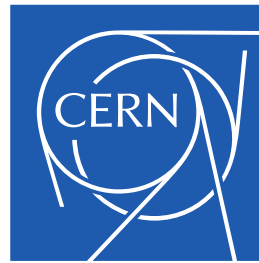
- MPS preparation activities.
- Chicane converters preparation activities.

## To be decided by LIU-PSB:

- Qstrip converters installation and commissioning.

## Also depending on magnet, cables and WIC availability:

- BI.BVT converters installation and commissioning.
- Correctors and quadrupoles installation and commissioning (cannot be split).



[www.cern.ch](http://www.cern.ch)