

# Phase Reference Line

**Contact persons**

ESS Lund contact person: [Rihua Zeng](#)

3D integration: [Carl-Johan Hårdh](#)

Stakeholders: [Wojciech Wierba](#), [Krzysztof Czuba](#), [Krzysztof Oliwa](#), [Dominik Sikora](#), [Mateusz Zukocinski](#), [Tomasz Lesniak](#)

**Useful links**

[ESS-0018421](#) PRL in tunnel (envelope)

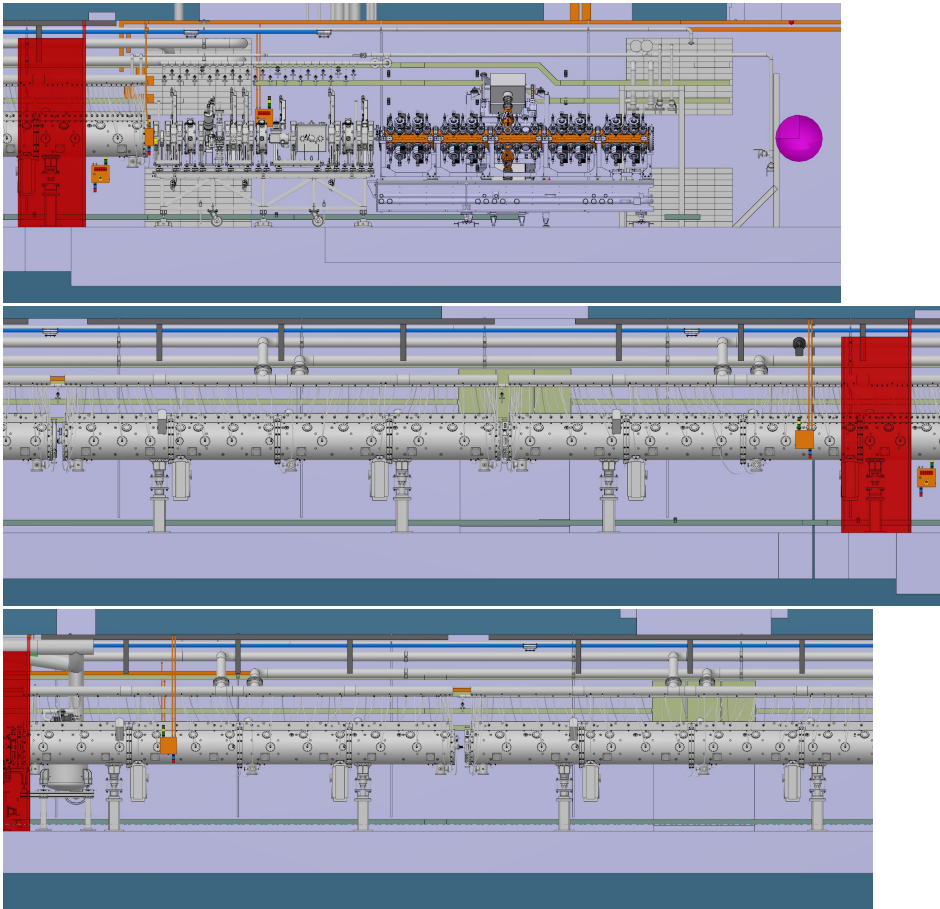
[ESS-0089756](#) PRL assembly

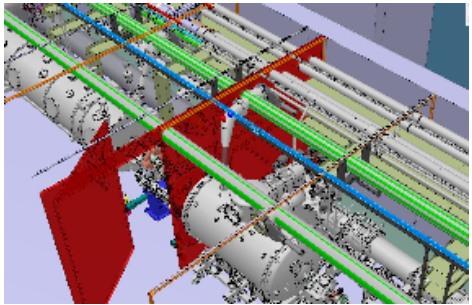
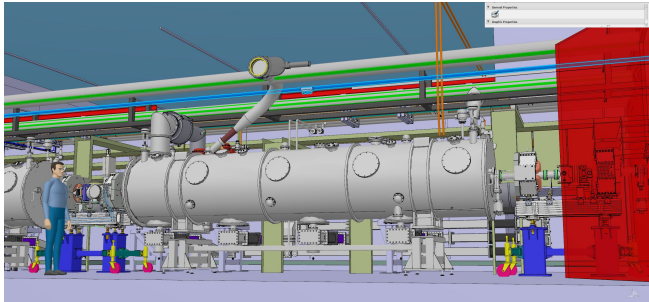
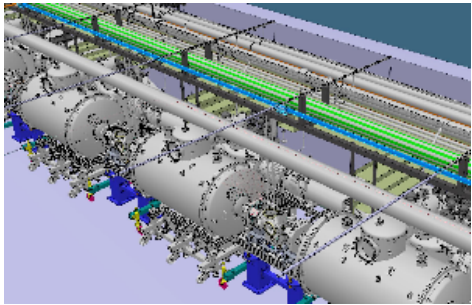
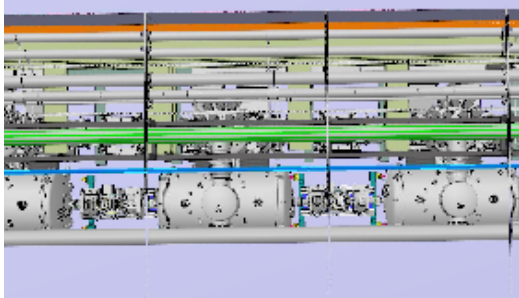
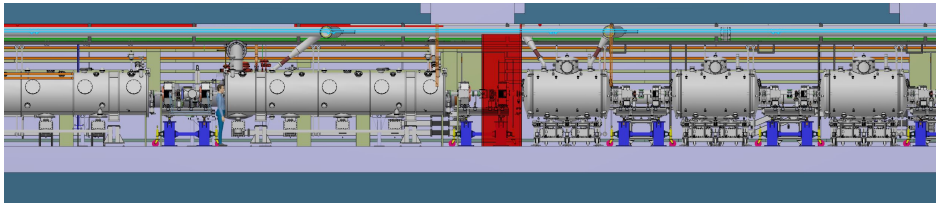
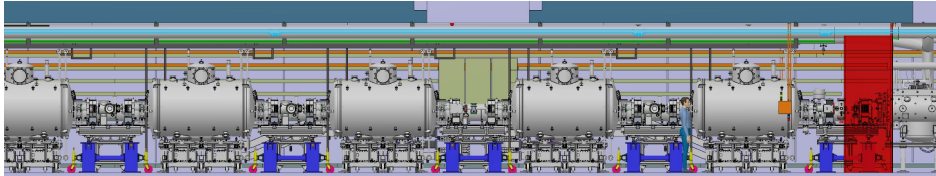
**Tasks!**

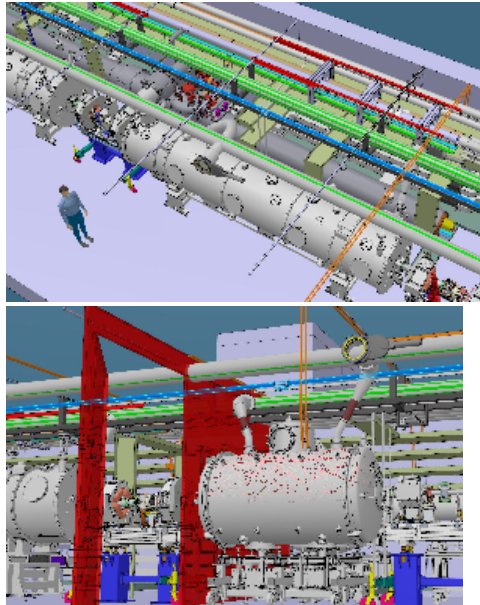
| Description                                                                                            | Due date | Assignee         | Task appears on      |
|--------------------------------------------------------------------------------------------------------|----------|------------------|----------------------|
| <input type="checkbox"/> add PRL to wall as shown in picture (keep both lines..)<br>) Carl-Johan Hårdh |          | Carl-Johan Hårdh | Phase Reference Line |

2017-05-12

Checked new PRL input with EPL







2017-05-11

- Input on PRL from IKC
- Power couplers placed acc. to xls spread sheet
- PRL positioned (center of pipe) 302mm from support of instrument air pipe
- added installation envelope around PRL for reference and visualization.
  - added picture to show how the area will look when PRL will be installed

Hi Carl,

We have prepared a -final version of the PRL design.  
Could you please update the 3D model of the tunnel with our PRL proposal?  
The attached XLS file has new positions of the couplers (column G).  
These positions are coupler center positions.  
The coupler length is 250 mm and you have already received its 3D model in .stp file from Tomasz Lesniak in last days.  
As you know the PRL has thermal insulation all along.  
The couplers + tap points have thermal insulation shell.

We would like to ask you to place the PRL with the new coupler positions into the 3D tunnel model to check for collisions, etc.

Due to thermal expansion of the rigid line which is made of copper, due to tolerance of the components lengths and due to servicing reasons, etc. the PRL needs to have some clearance (in the x-direction along tunnel axis). That is why the coupler+tap points should not be placed in close proximity to other tunnel objects (barriers in the x-direction along tunnel axis). The clearance in y- and z-direction (perpendicular to the tunnel axis) has already been discussed by Wojciech Winieta and Krzysztof Oliva so I think you have got these information.

We decided to wait with design of the PRL in A2T DUMP zone area so please focus on the straight tunnel now and we will continue design in A2T later when we have more confidence about that area.

We are open for discussion and your suggestions but please keep in mind that we have to finalise the design very, very soon.  
Installation of the PRL starts on 2nd July and we have to order rigid line sections ASAP.

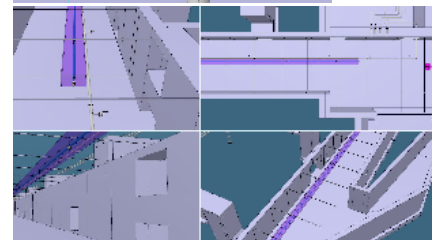
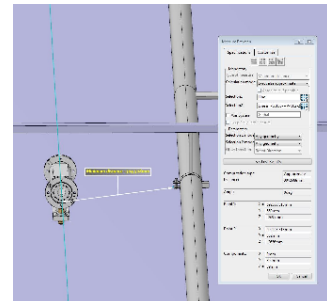
Best regards,  
Mateusz



Copy of t...\_v.4.xlsx



PRL\_schem...2.0\_1.pdf



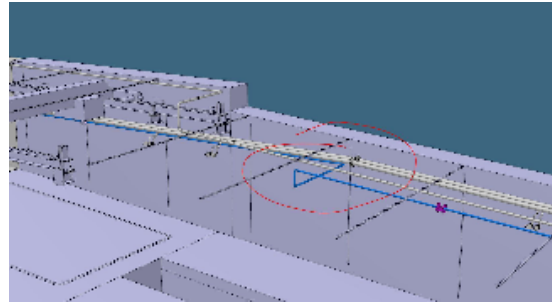
2017-03-16

Meeting with IKC and AD (RF + integration + installation) regarding PRL bending in A2T area (because of crane):

- ☐ add PRL to wall as shown in picture (keep both lines...) Carl  
-Johan Hårdh

- flexible bends? could be added later

- check installations on wall (AD and CF)



**2017-03-16**

Meeting with IKC regarding PRL:

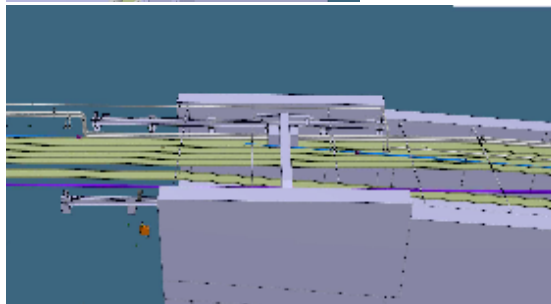
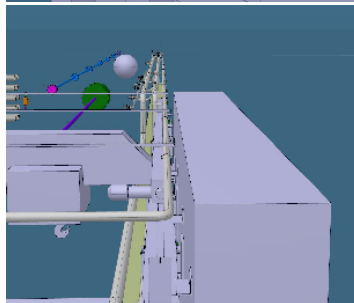
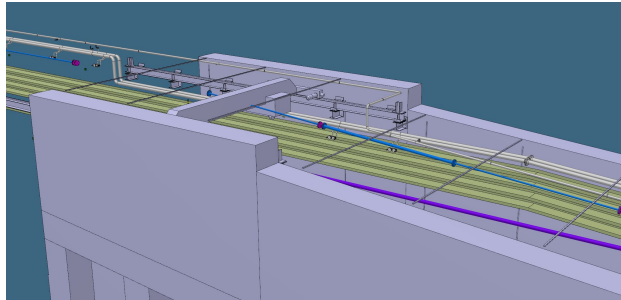
- frame for supporting PRL is very close to roof (30mm), see pdf. Today we have an envelope that is 100mm of free space in roof, is this solution possible?
- PRL might need to be moved closer to south wall due to installation frame and the couplers and cables that will have to be connected as well (very close to instrument air).

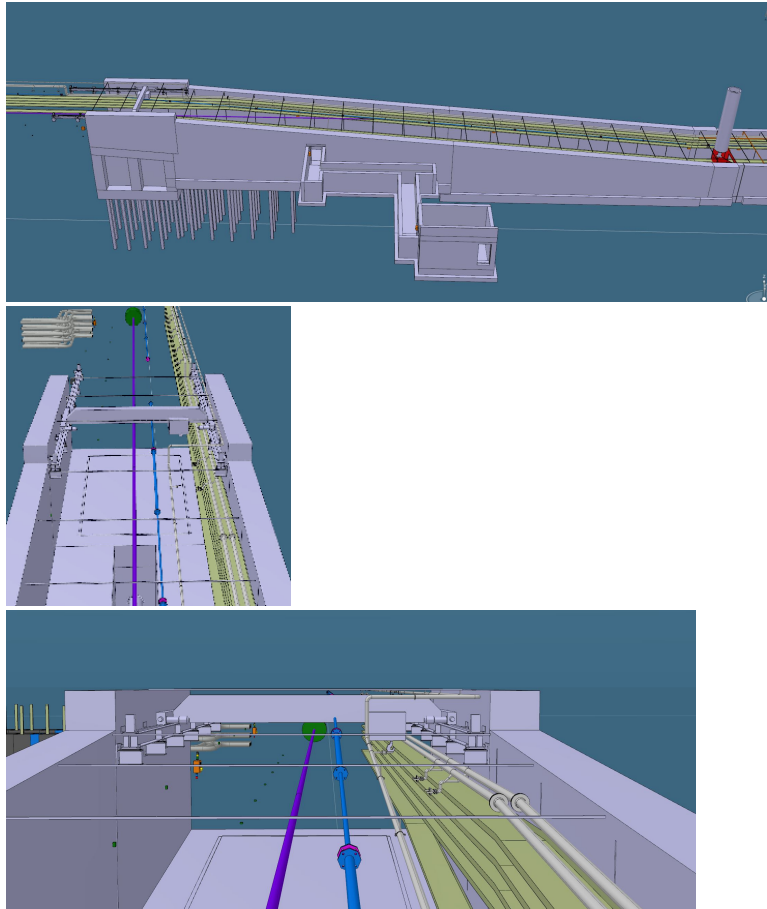
- ☒ move it down as well? more space? or will clash with other installations? to be checked!!! Carl-Johan Hårdh



**2017-03-06**

Quick check with Rihua Zeng regarding the PRL in A2T

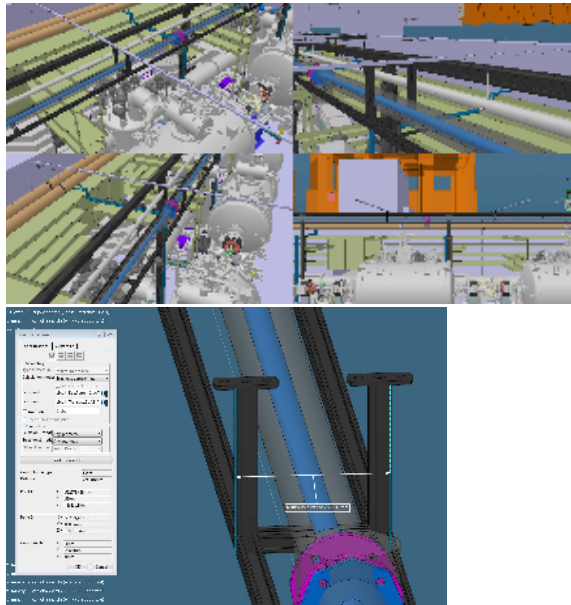




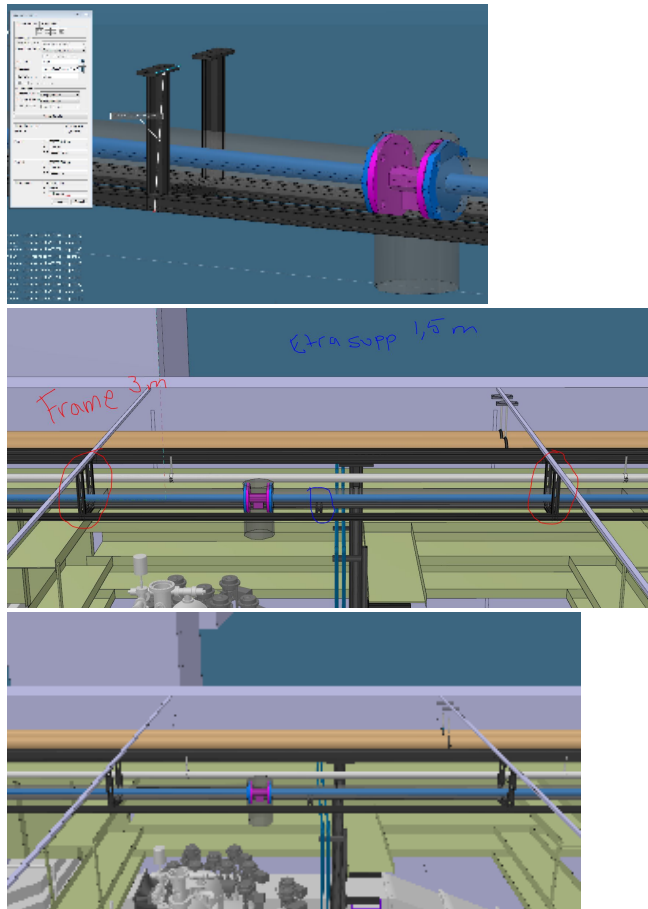
**2016-12-22**

Updated model:

- moved 50mm (from CF instrument air pipe)
- added support acc. to previous meeting.



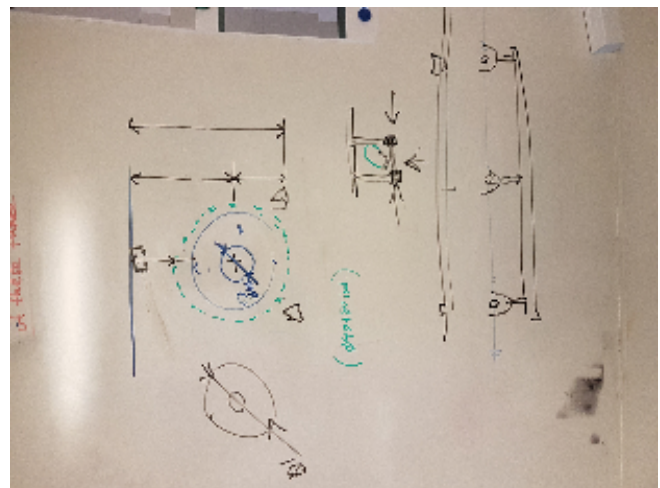


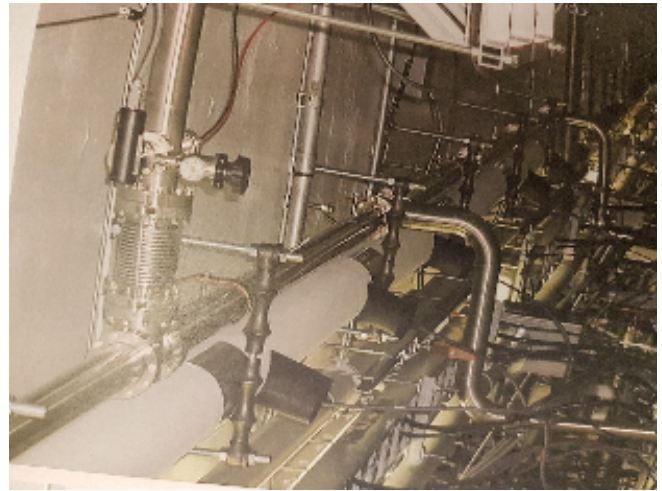


**2016-12-09**

Meeting with Rihua and Mats P:

- Use DO=160mm (if 55mm insul is not standard, 160mm = 60mm insul).
- Frame from HAC30 (see picture) as support and "protection"
- Frame from roof every 3m, extra support between (1,5m). Similar to SNS support (see picture) but with extra beam along pipe (for protection and to hold extra support)





---

**2016-10-28**

Meeting with Rihua regarding  
positions in tunnel:

- ☒ update model acc. to xls  
input Carl-Johan Hårdh
- pdf shows schematic of PRL



PRL\_input.xlsx

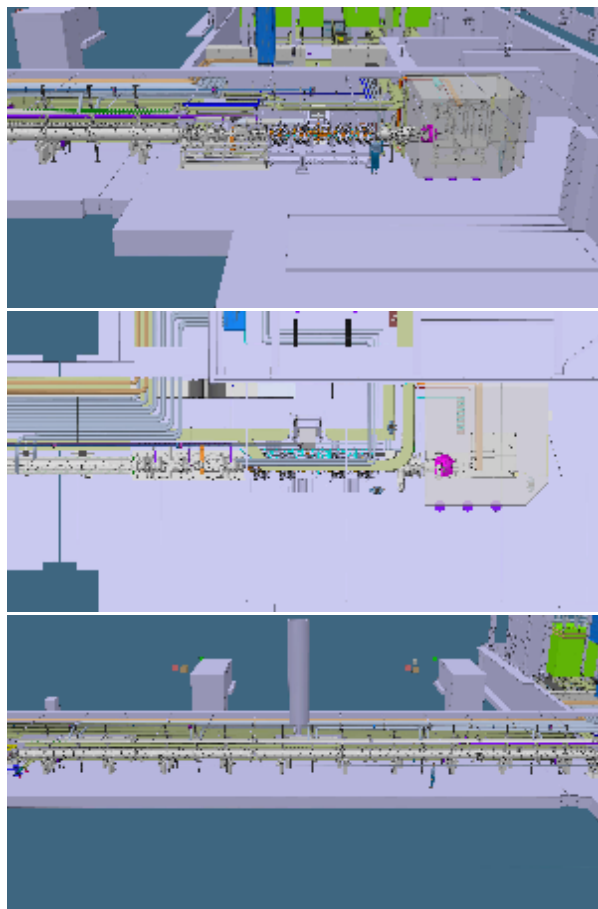


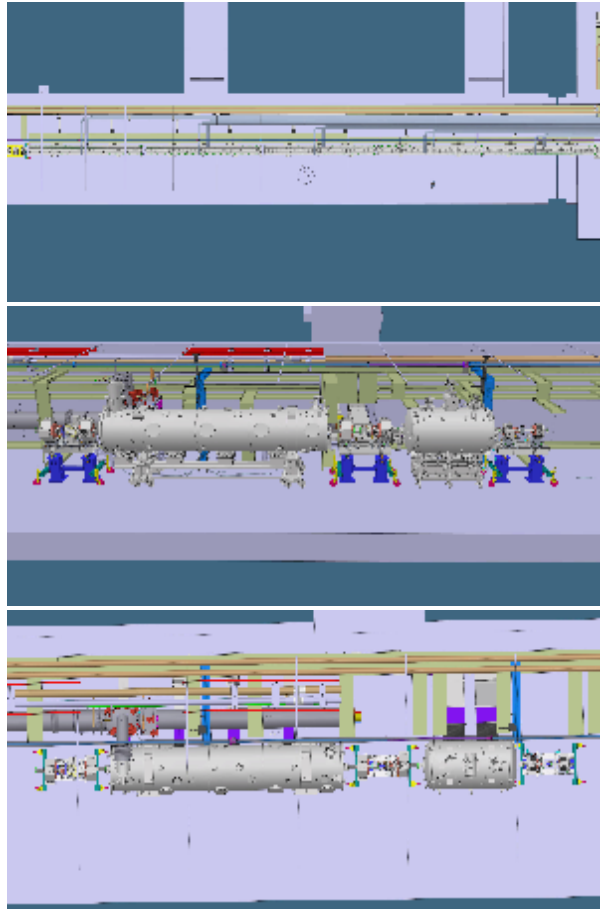
PRL\_sche...01.3.pdf

---

**2016-10-26**

Collected some screenshots to show  
today's position of PRL couplers in  
reference to the machine -->



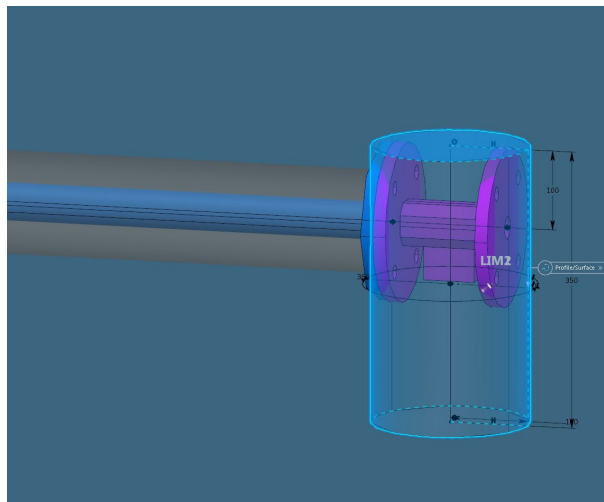


## 2016-10-25

Updated 3D model:

- Pipe = 40mm
- Added insulation on pipe = 130mm
- Added Insulation around instrumentation = acc. to picture

Still need to figure out if we need to move PRL. Will have discussion with WP16 after their PDR (hopefully more news next week).



## 2016-10-10

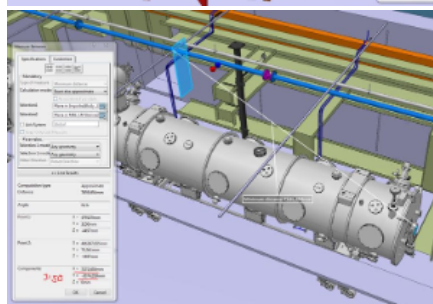
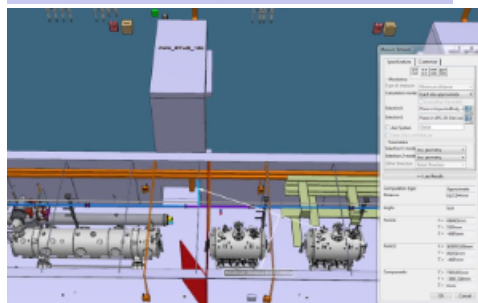
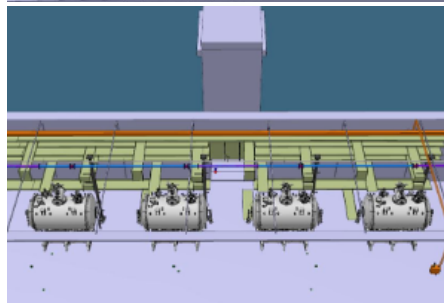
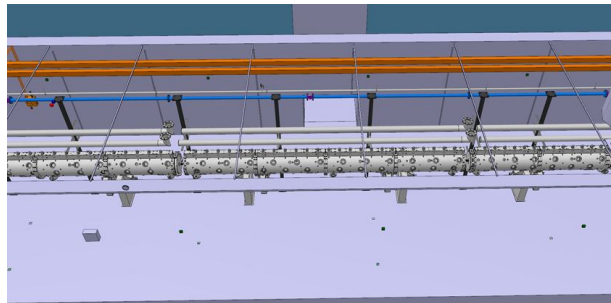
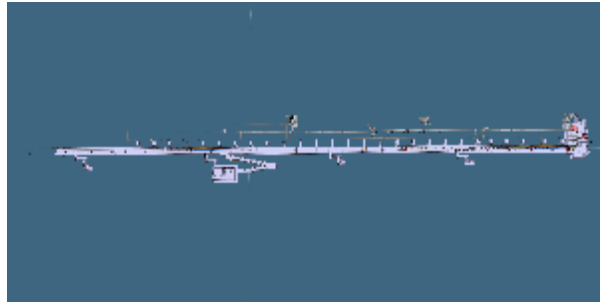
Meeting with Rihua, checked alot of dimensions and collected a bunch of pictures.

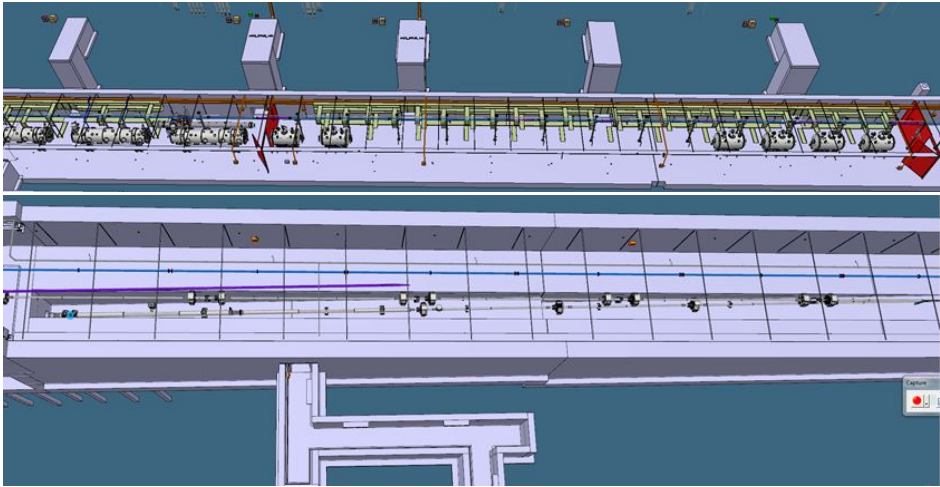
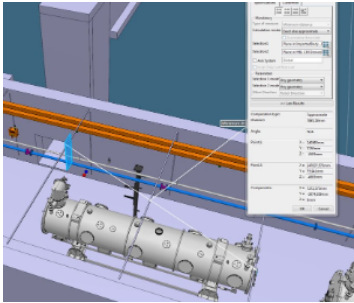
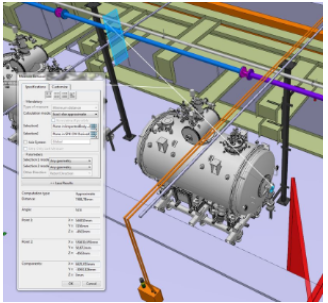
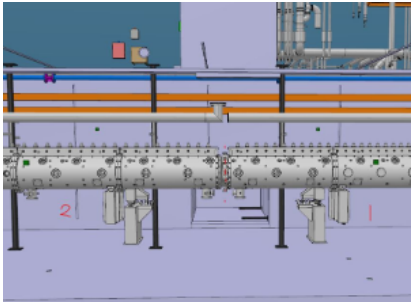
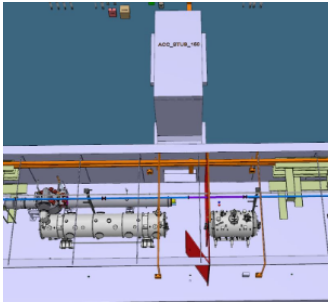
- agreed that PRL can be moved (since it now has grown bigger with insulation)

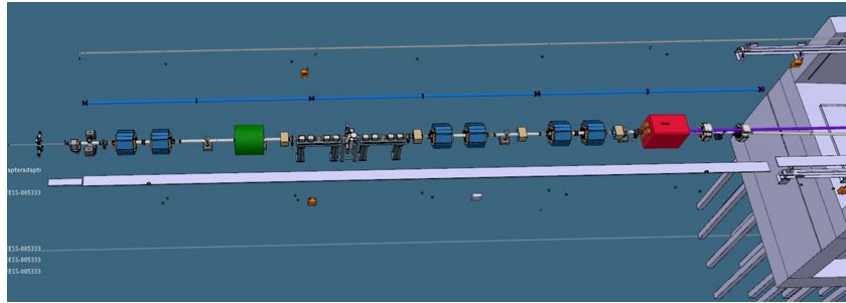


to make sure we have enough space to roof and instrument air pipe. we foresee minor change of approx 50mm...

✓ move PRL Carl-Johan Hårdh







**2016-10-05**

Meeting with Rihua and IKC partner:

- Showed 3D model for IKC
- Rihua to collect MOM and send out info
  - ☒ Dia of insulation = 130mm Carl-Johan Hårdh
  - ☒ Pipe dia = ~40mm Carl-Johan Hårdh
  - ☒ See sketch for more input Carl-Johan Hårdh

