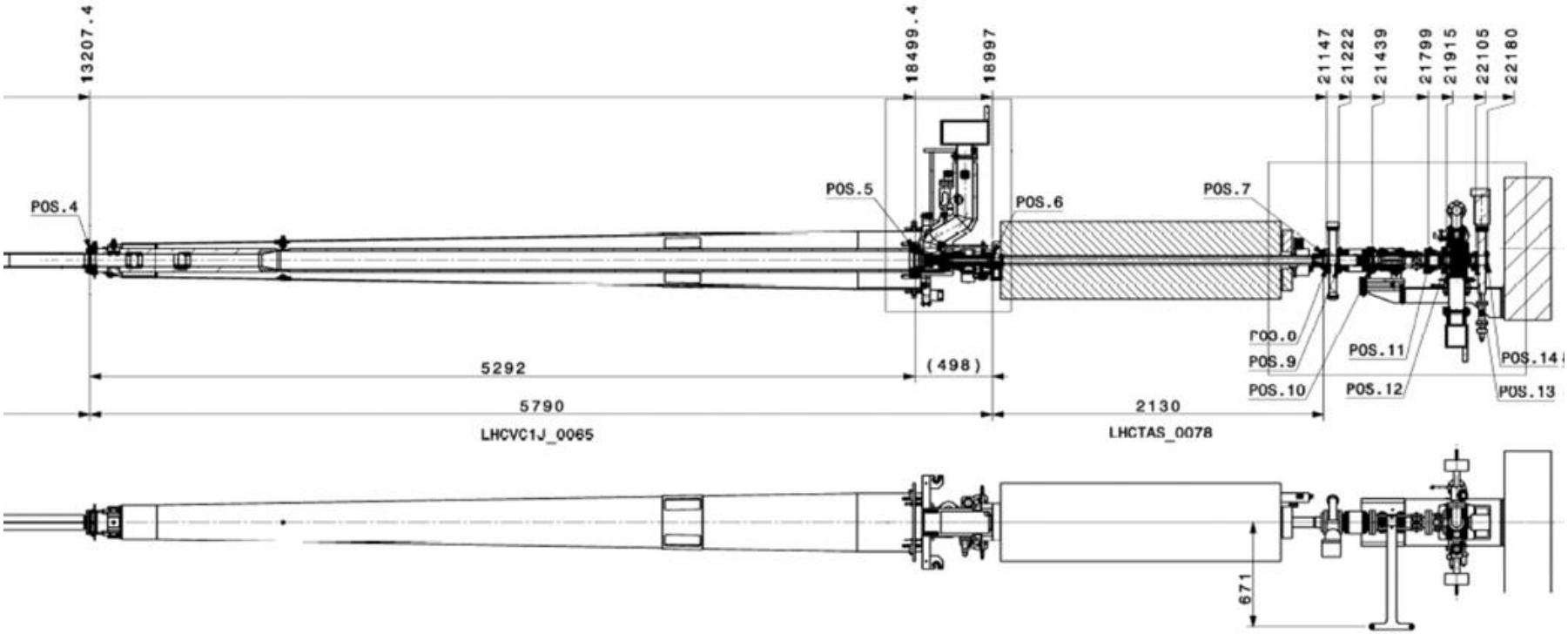
32nd HL-LHC TCC
WP8 Final layout of Q1-TAX (VAX) area

F. Sanchez Galan on behalf of WP8

CERN, 29 June 2017

From today's VAX to HL-LHC



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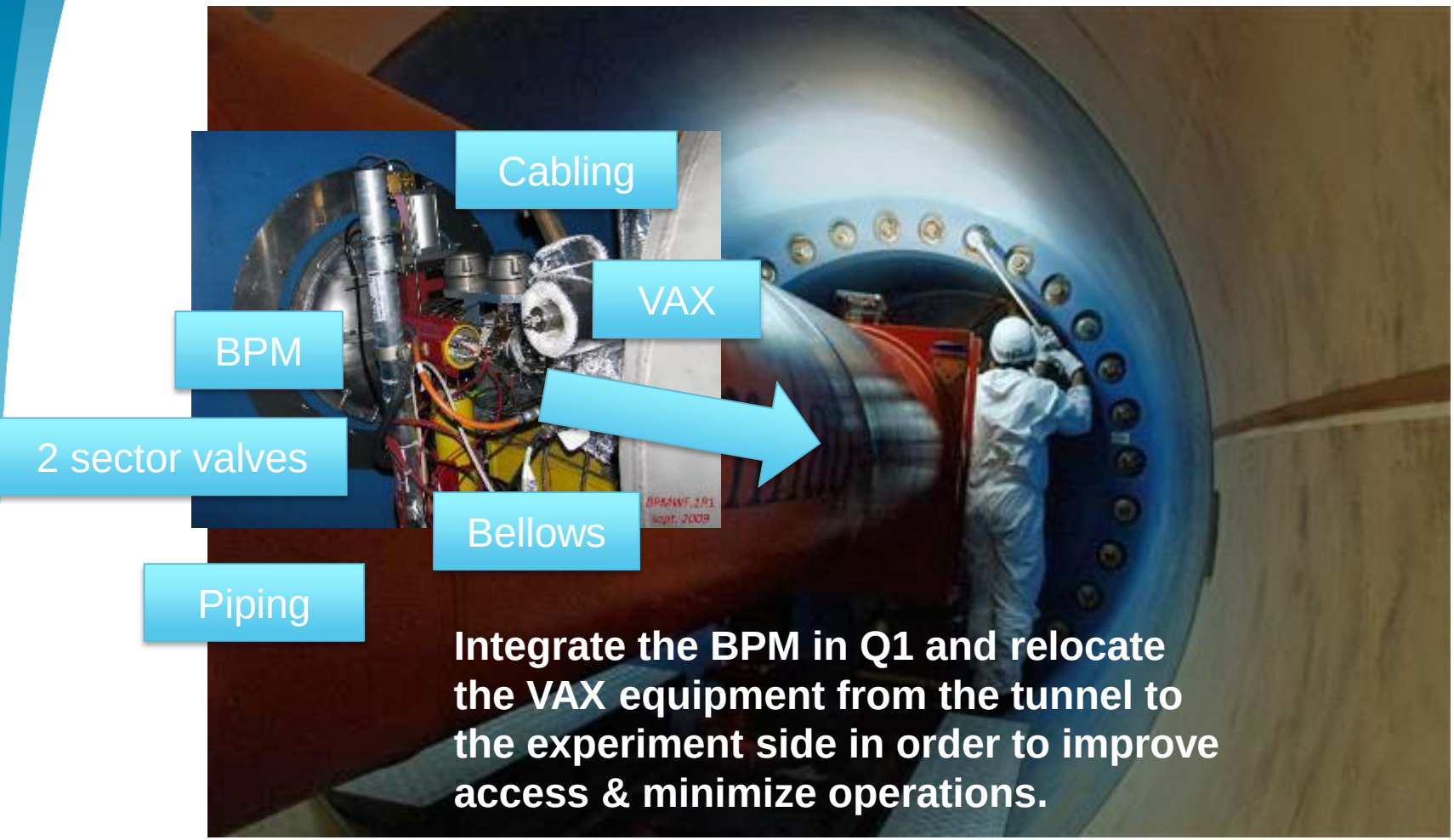
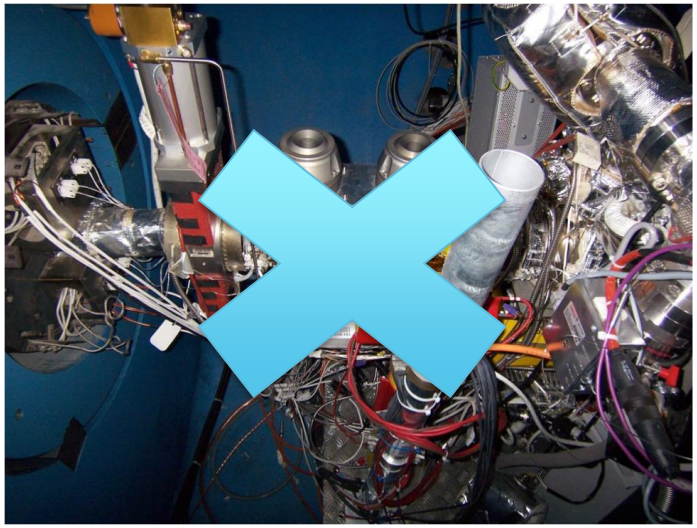
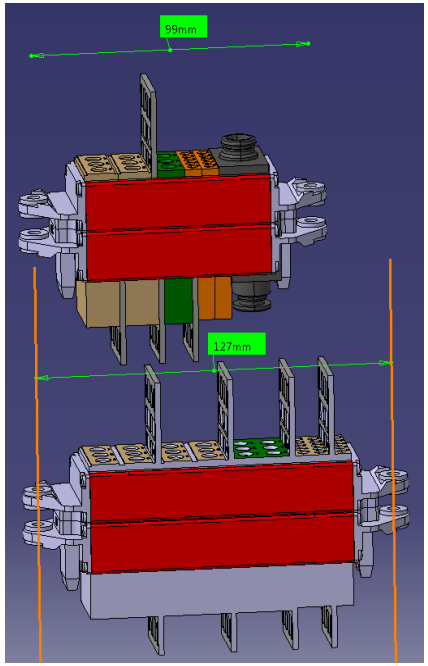
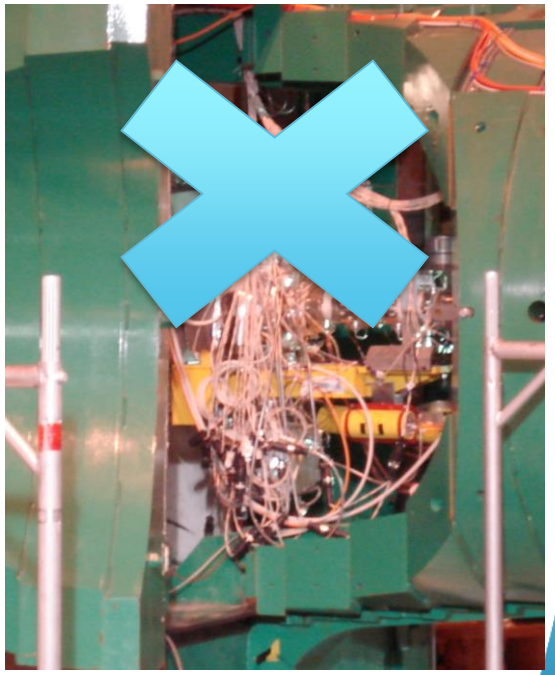


Cabling layout (P1 & P5)

- Cabling needs already defined with the collaboration of WP12, TE-VSC, operation.
- Routing discussed/adapted with experiments.
- Quick connectors requirements defined.
- Market survey being launched, prototyping ahead.
- https://edms.cern.ch/document/1788841/1

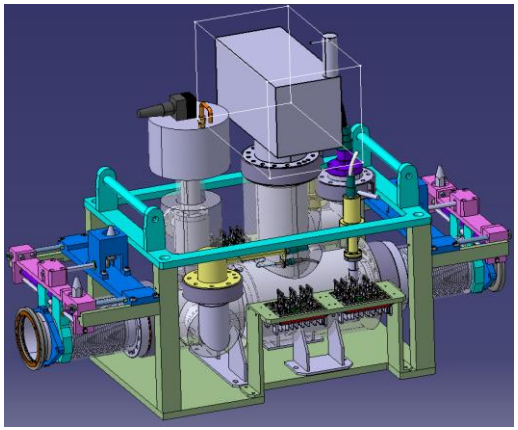


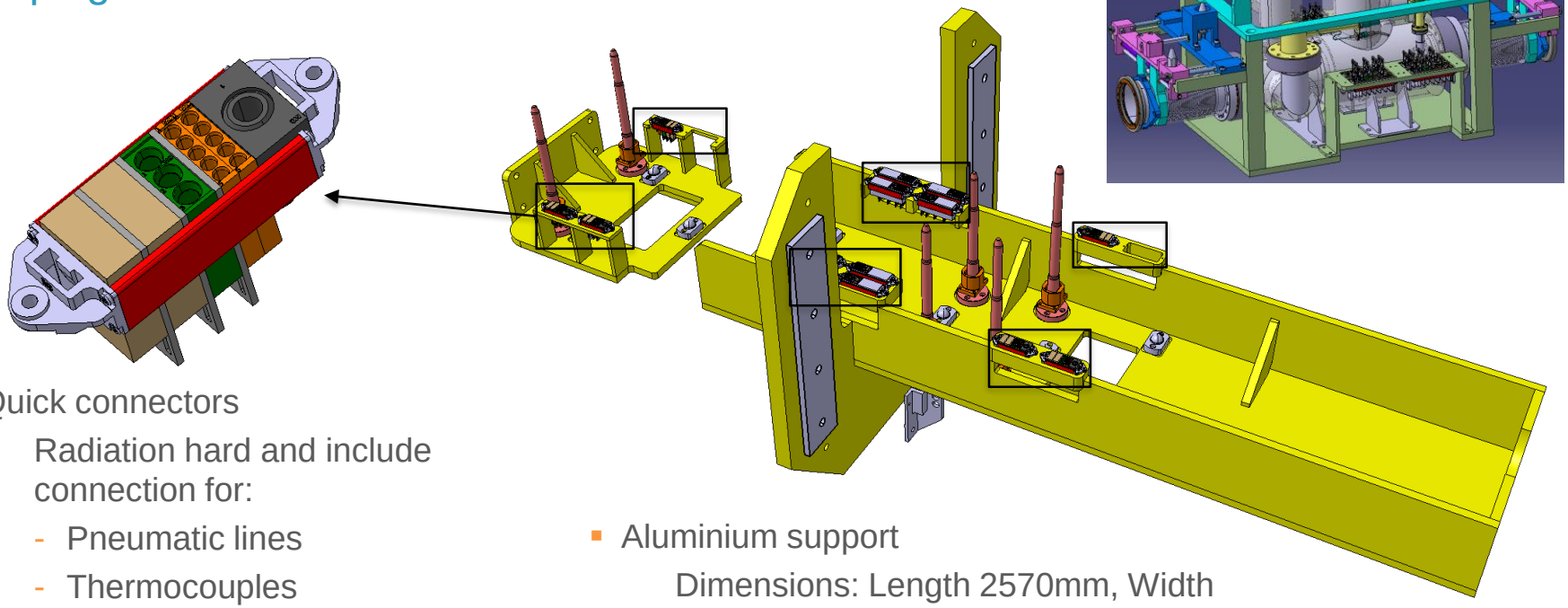




Layout. VAX

New support structure to host VAX, sector valves and bellows. Remote handling based on quick connector plugins.





- Quick connectors

  Radiation hard and include connection for:

  - Pneumatic lines
  - Thermocouples
  - Vacuum valves actuators.

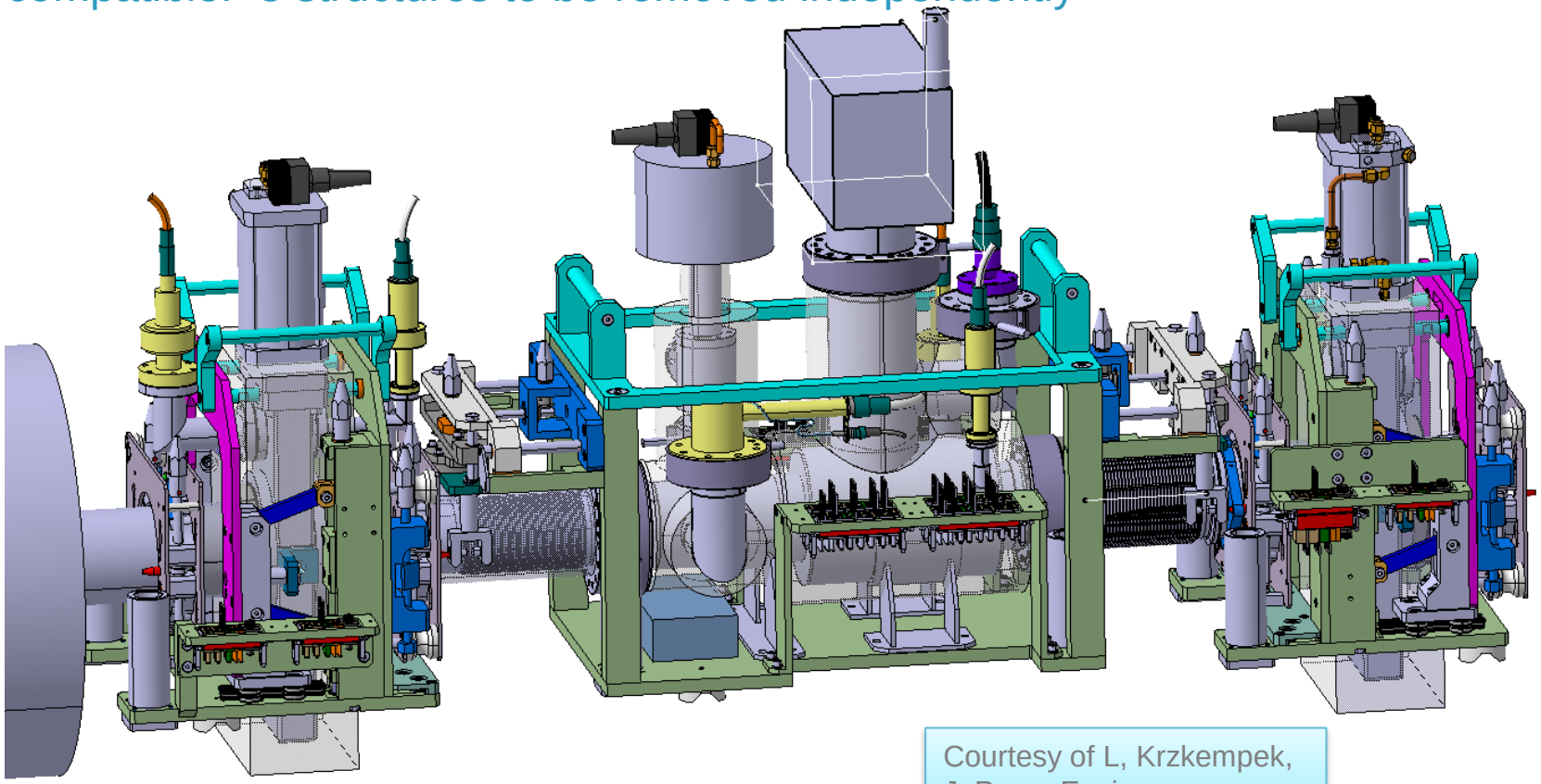
- Aluminium support

  Dimensions: Length 2570mm, Width (max.) 1030mm, Height (max.) 955mm

Prototype ongoing (DR connectors market survey, modules WP12)

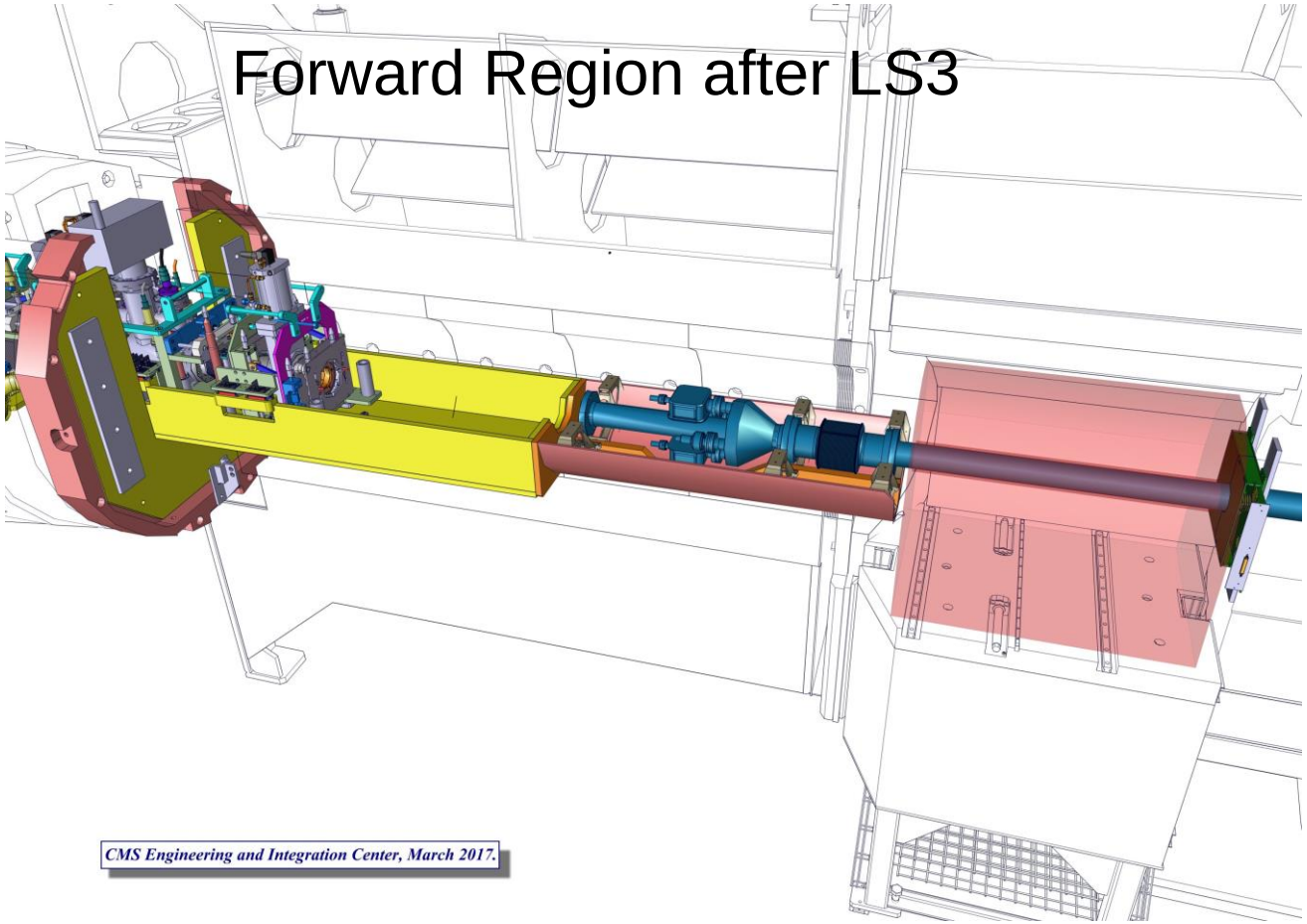
Layout VAX

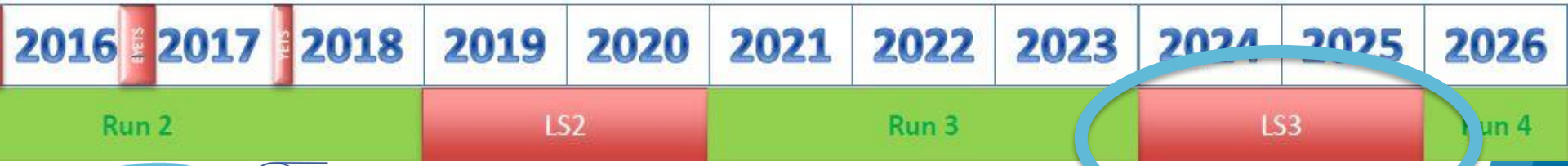
Common layout for both sides of ATLAS & CMS based on **standard vacuum elements**, automatic connectors and vertical installation. Baking compatible. 3 structures to be removed independently



Courtesy of L, Krzkempek, J. Perez Espinos

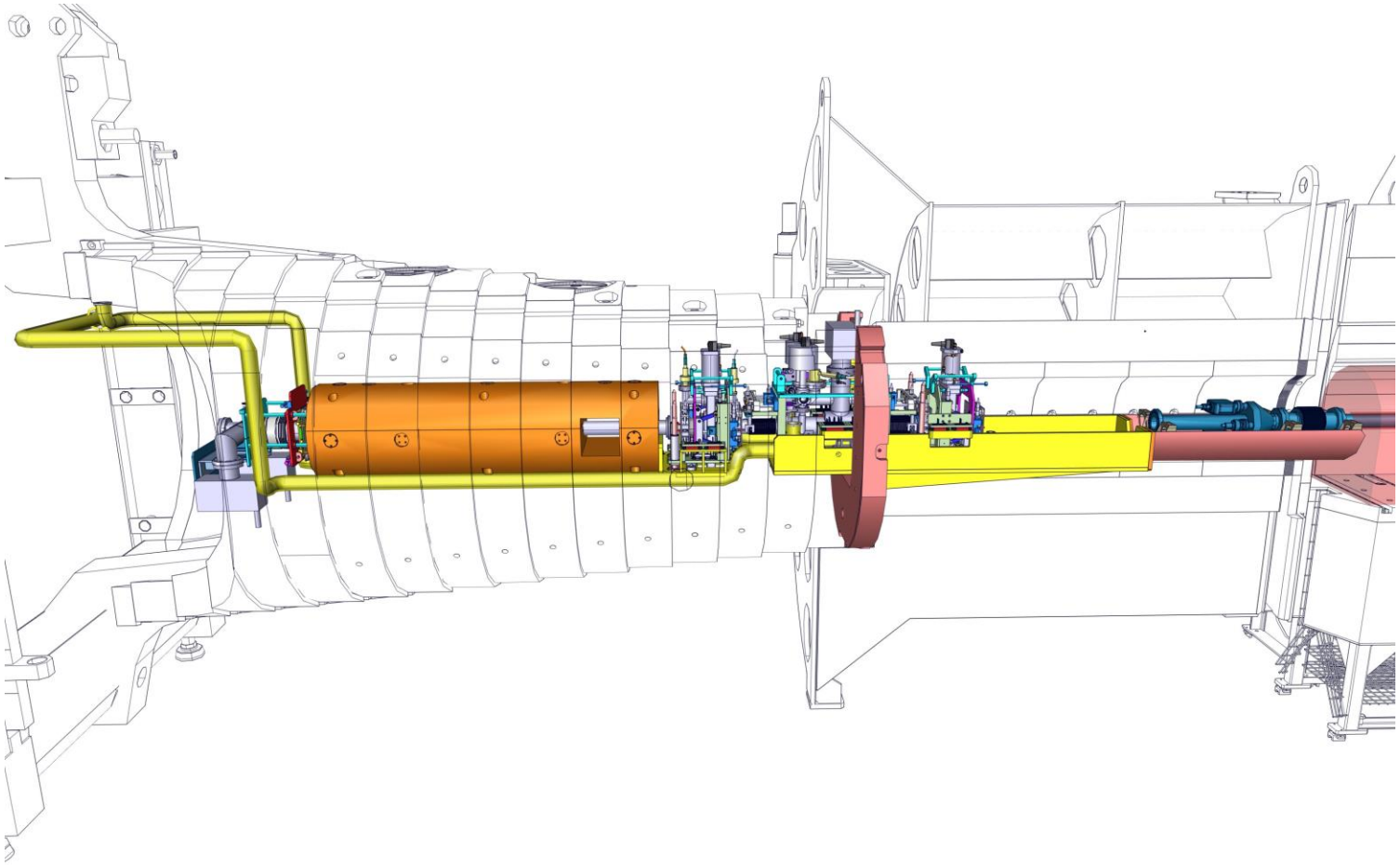
VAX integration- CMS





VAX integration- CMS

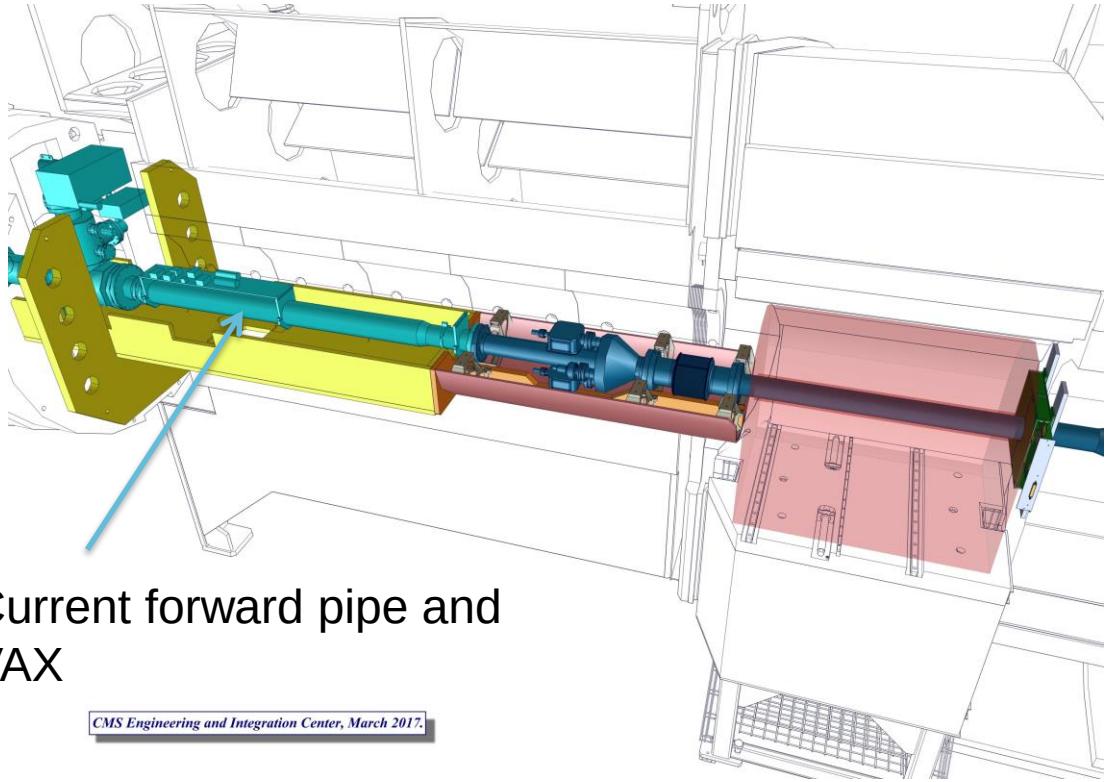
TAS Region after LS3



CMS Engineering and Integration Center, March 2017.

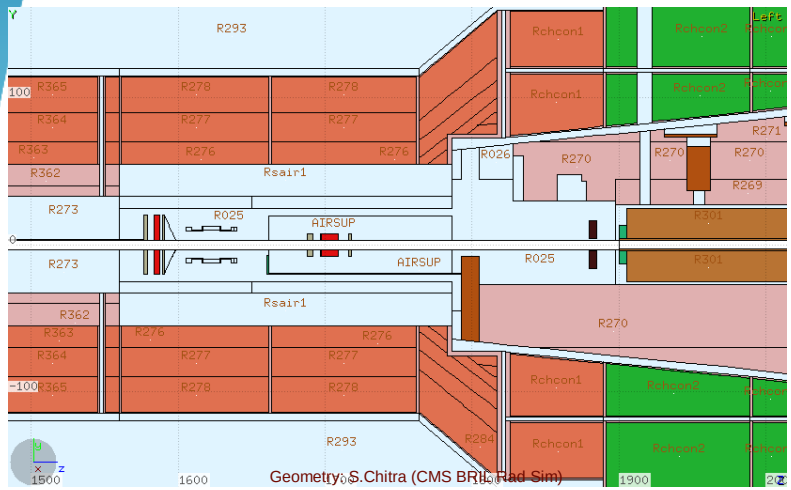
VAX integration- CMS

Solution accepted by CMS, takes into account vacuum modifications in LS2. (New support will host VAX modules)

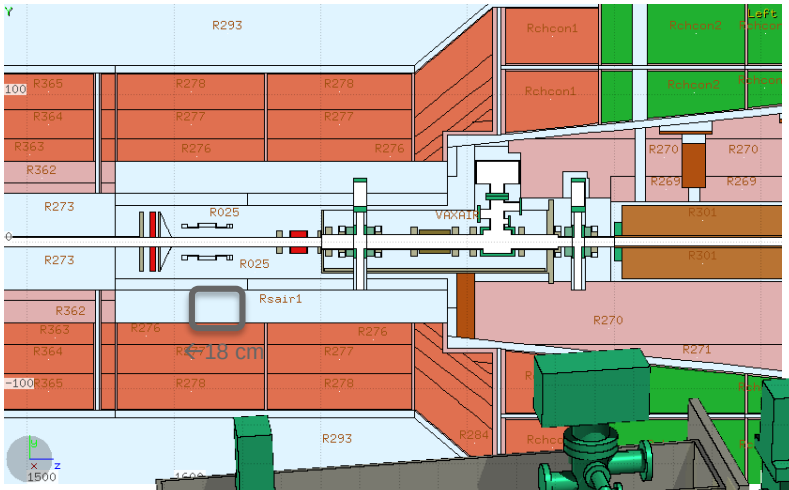


Current forward pipe and VAX

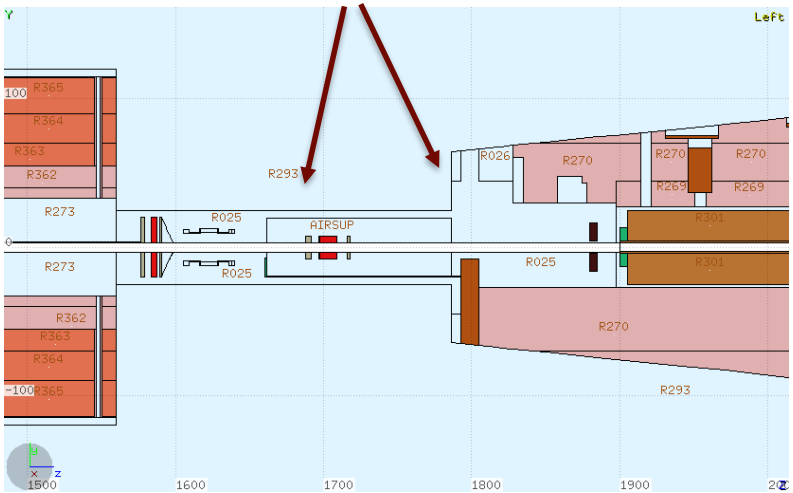
VAX implementation in CMS

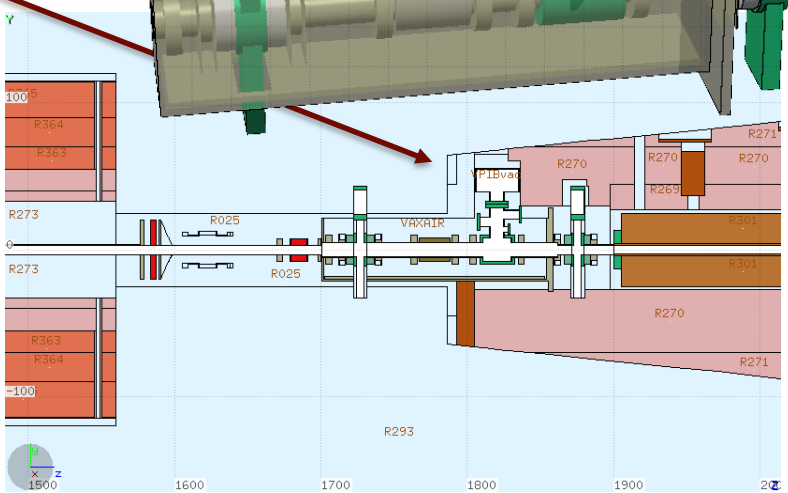


Geometry: S.Chitra (CMS BRIL Rad Sim)



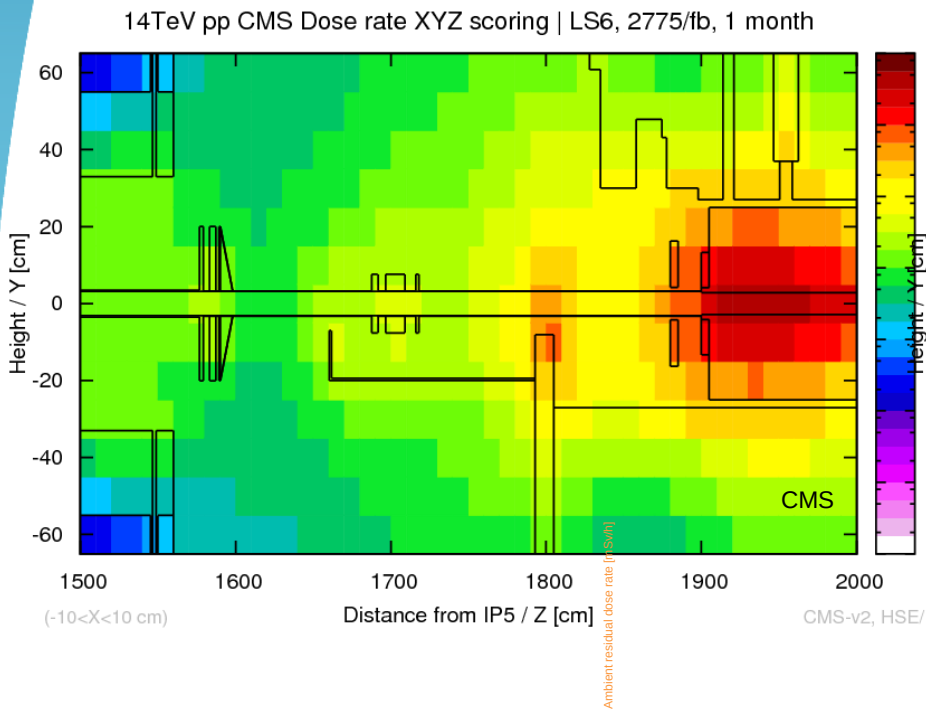
Included gaps in support tube and FIN

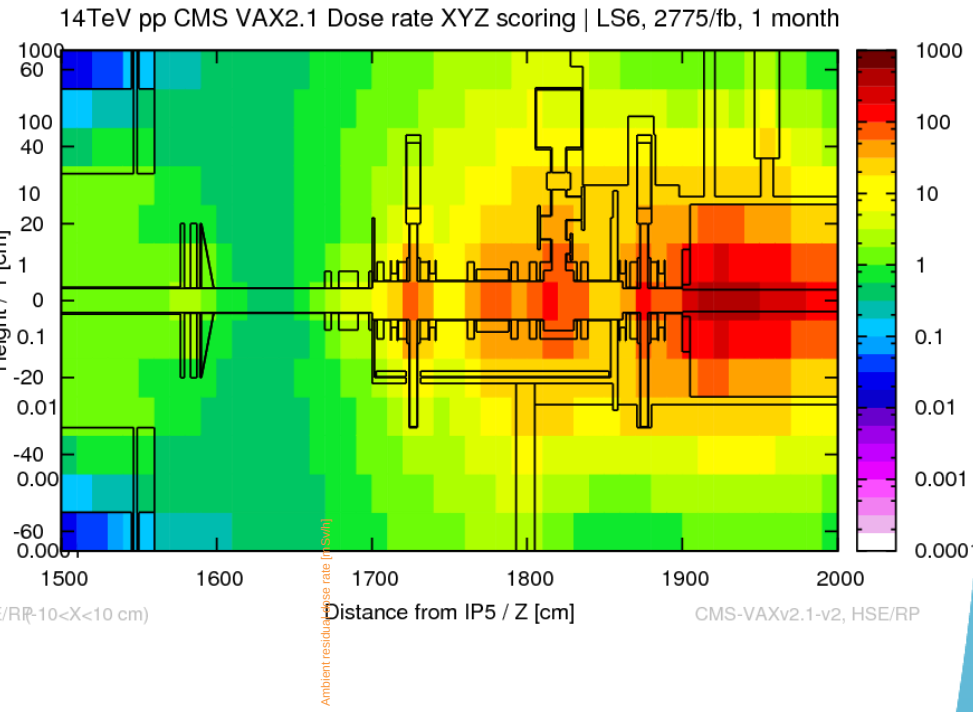




Ida Bergstrom, Heinz Vincke (HSE/RP)

CMS, H*(10) in mSv/h, LS6 1 months cooling



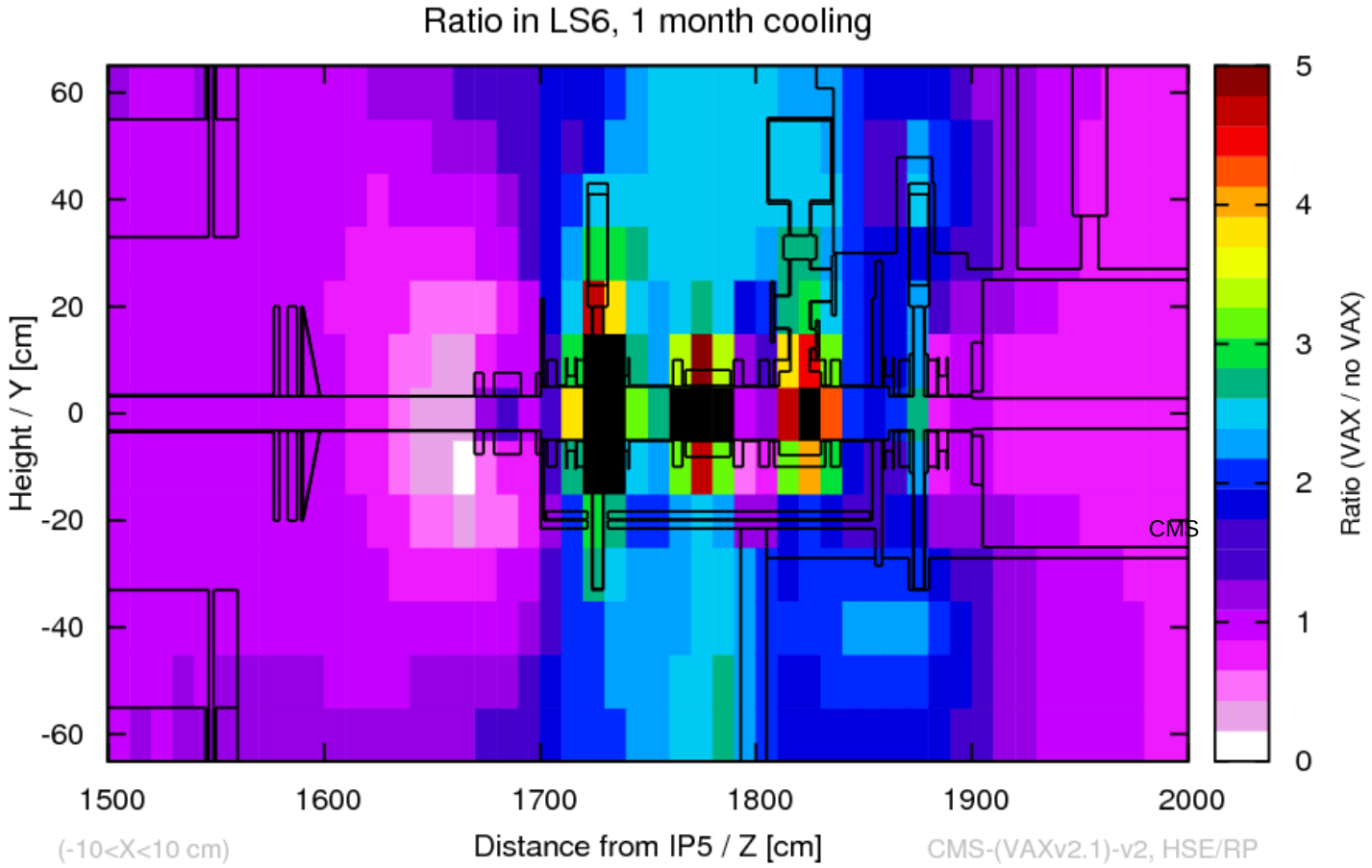


Ida Bergstrom, Heinz Vincke (HSE/RP)

Status update of FLUKA radiation study of new VAX installation in CMS & ATLAS – 38th HL-LHC WP8 meeting (2016-08)

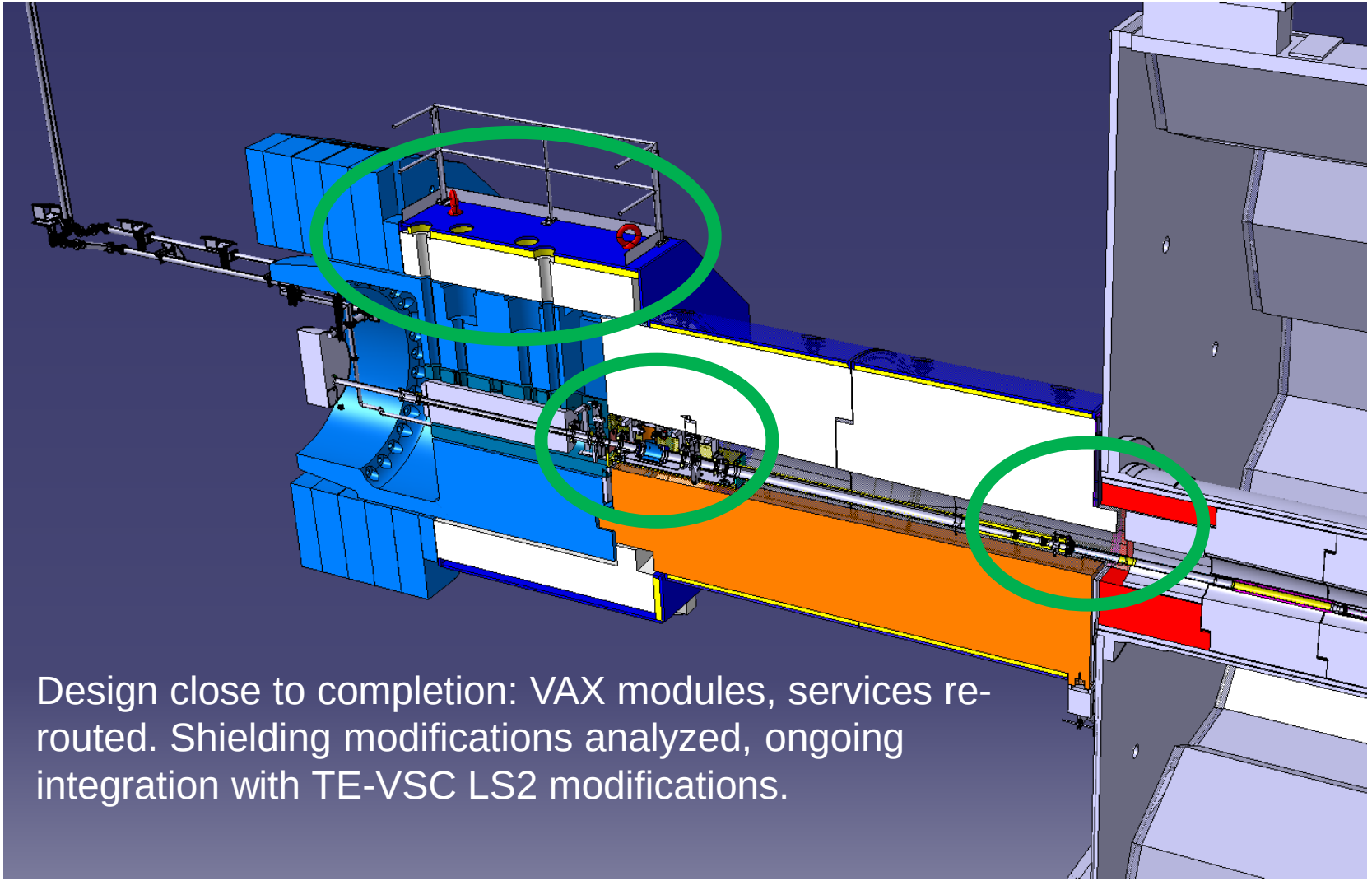
Radiological assessment of the proposed installation of vacuum equipment upstream of TAXS at Points 1 and 5, EDMS 1713941, CERN-RP-2016-146-REPORTS-TN IDA BERGSTROM

CMS H*(10) in mSv/h, LS6 1 months cooling



Ida Bergstrom, Heinz Vincke (HSE/RP)

ATLAS Layout



- Design close to completion: VAX modules, services re-routed. Shielding modifications analyzed, ongoing integration with TE-VSC LS2 modifications.

Shielding modifications- ATLAS

New rectangular support structure

Machining: TX1S (vertical slot)

JFS3U

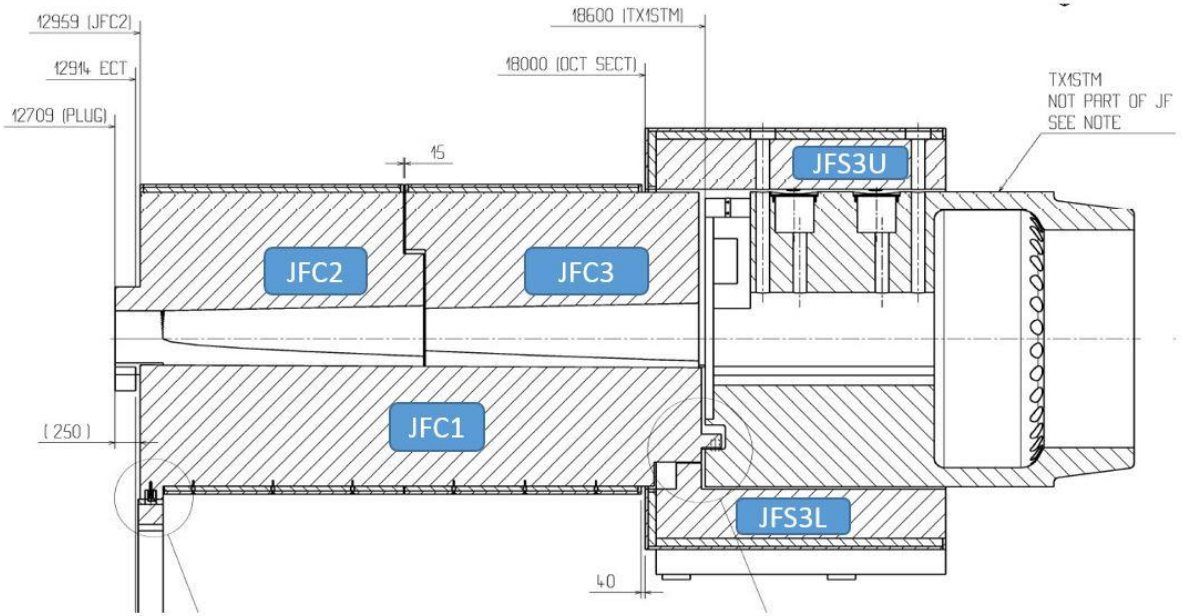
JFC3

JFC1

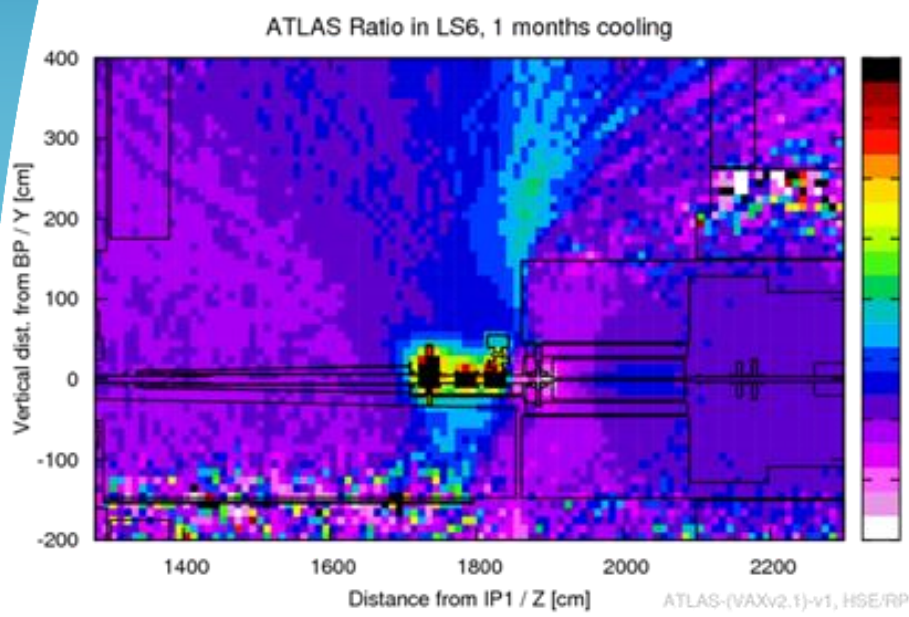
JTT

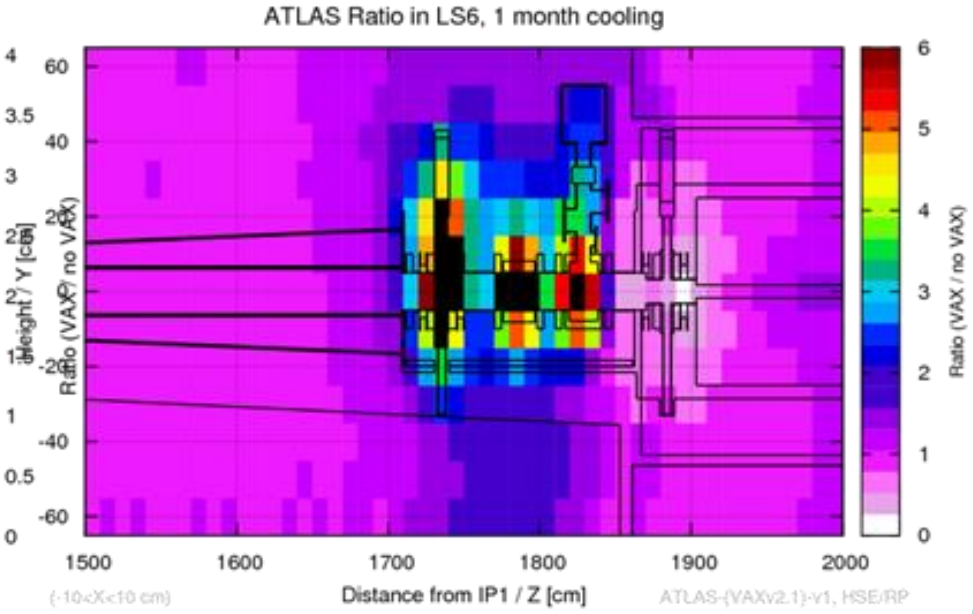
Modification: JFC2

Component	Approximate weigth (kg)	To be removed (kg)
JFC1	84000	500
JFC2	93000	69
JFC3	97000	150
JFSU	77000	400
JFSL	66000	450
JTT1	13000	1300



ATLAS H*(10) in mSv/h, LS6 1 months cooling

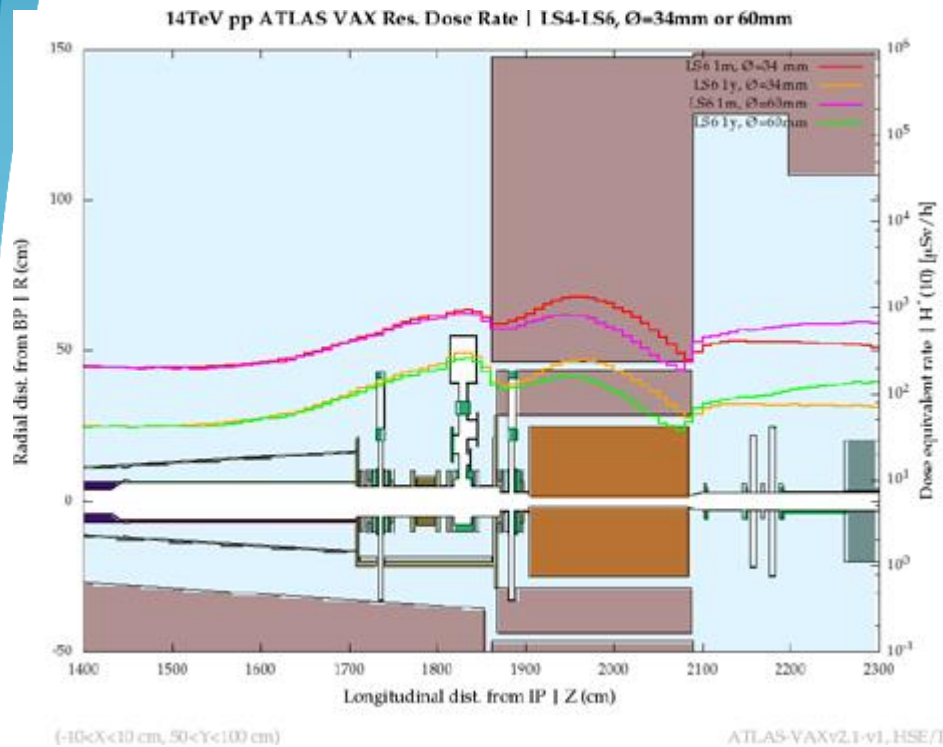


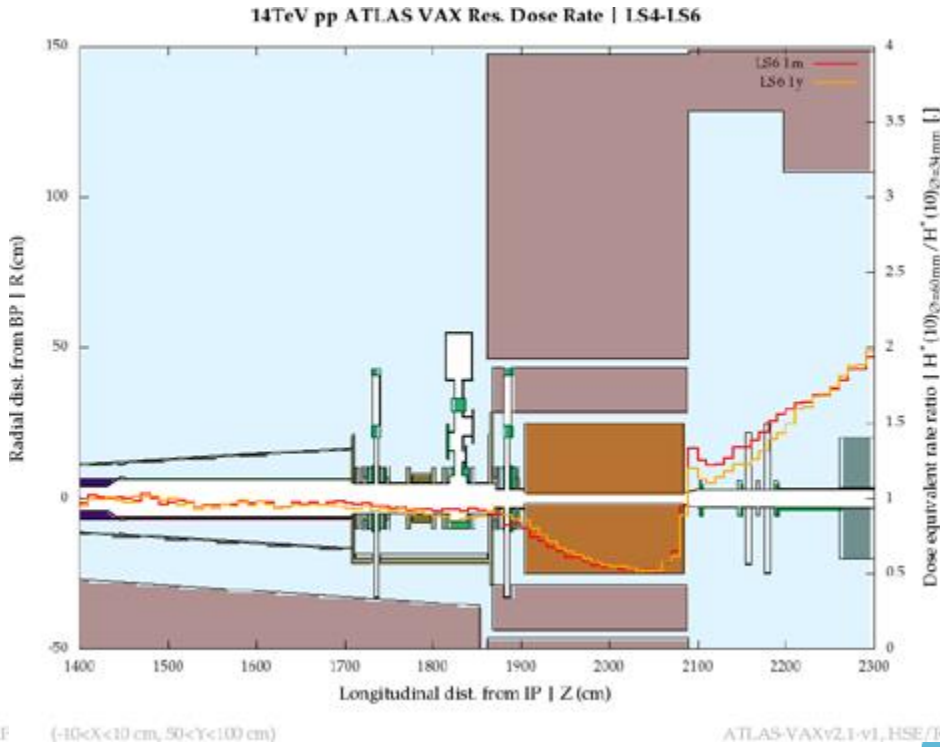


Ida Bergstrom, Heinz Vincke (HSE/RP)

Radiological assessment of the proposed installation of vacuum equipment upstream of TAXS at Points 1 and 5, EDMS 1713941, CERN-RP-2016-146-REPORTS-TN. IDA BERGSTROM, J.C ARMENTEROS CARMONA

TAS Vs TAXS (34 vs 60 mm)





Dose rates and their ratio in ATLAS after installing the vacuum equipment with two different TAXS apertures, 60 mm/34 mm

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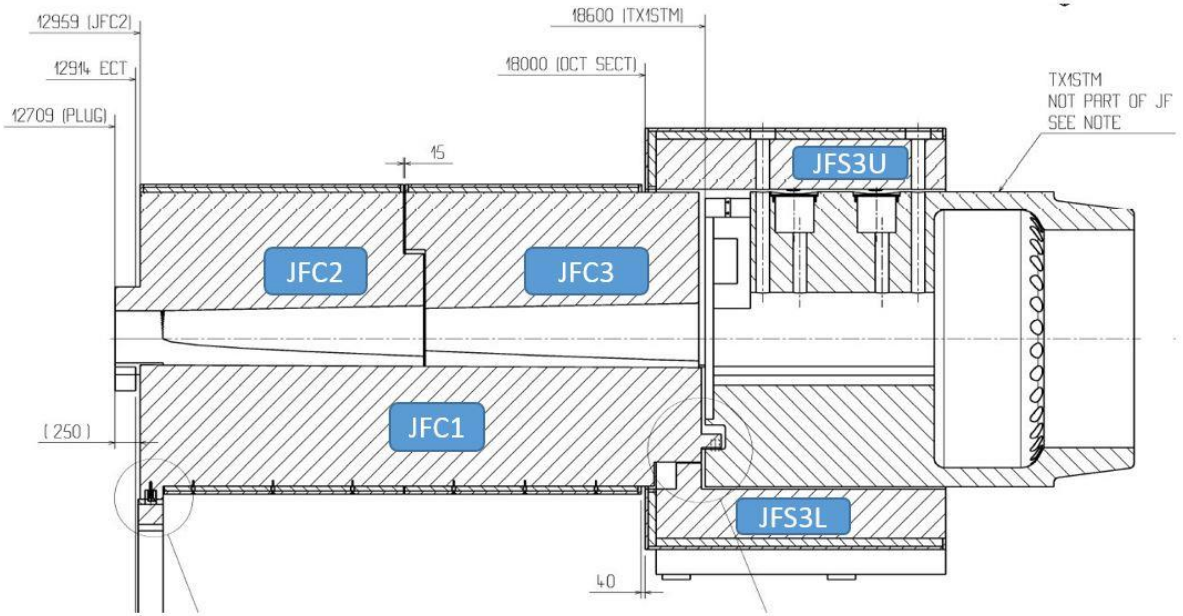


Removal/Installation scenarios

- TAS removal

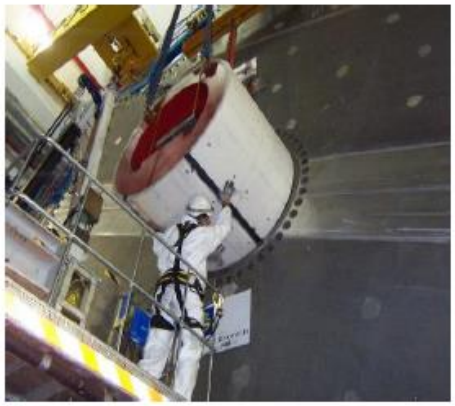
ATLAS https://edms.cern.ch/document/1764384/2

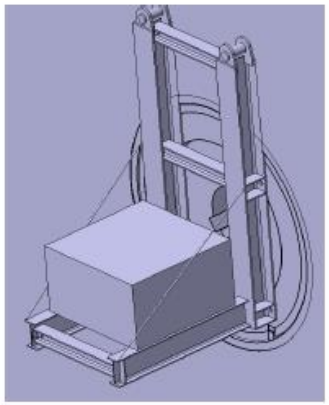
CMS https://indico.cern.ch/event/647382/contributions/2630663/attachments/1479507/2293645/INDC_WP8_pres_2_20170620.pdf

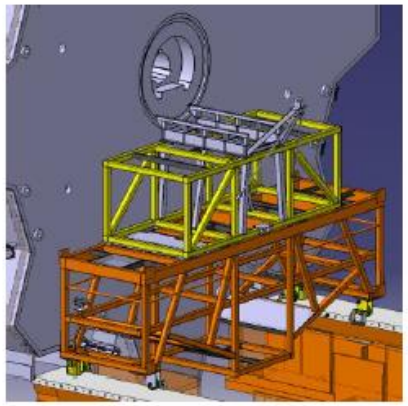
- JTT Removal https://edms.cern.ch/document/1817010/1

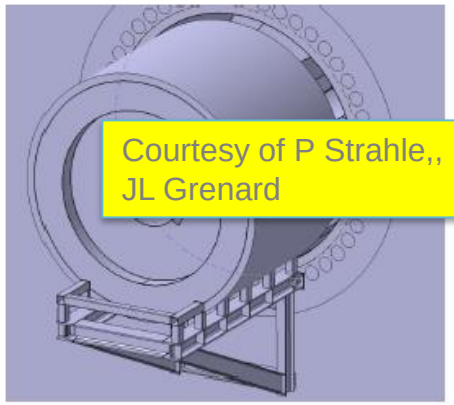
Work progress Installation/removal

Version 1	Version 2	Version 3	Version 4
Very few extra equipment needed	Difficult to balance the weight	Easy handling	Easy handling
Difficult handling	Requires a complex weight adjustment system	A lot of equipment can be reused	Requires changes to the ECT
Highest risk for the operators	Space in the tube is very limited	Not sure if the mini van is stable enough	Additional load to the ECT end plate









Courtesy of P Strahle,, JL Grenard

Summary

- VAX layout proposed.
- CMS approved the VAX and the advance of some installation activities to LS2
- ATLAS approval pending on agreement of JTT modifications (activity to be advanced to LS2)
- Radiation impact assessed (ATLAS & CMS)
- Background calculations (neutron/photon flux) ongoing (BRIL-CMS)

Next steps

- JTT modifications, (→ATLAS approval)
- TAXS Alignment
- EDMS Documents about required shielding modifications.
- Q1-TAXS
- Prototype, test handling & plug-in principle.
- Coordinate installation/deinstallation schedules (machine-experiments)

Thanks to all members of WP8& collaborators!