Discussion on UT assembling, testing and installation

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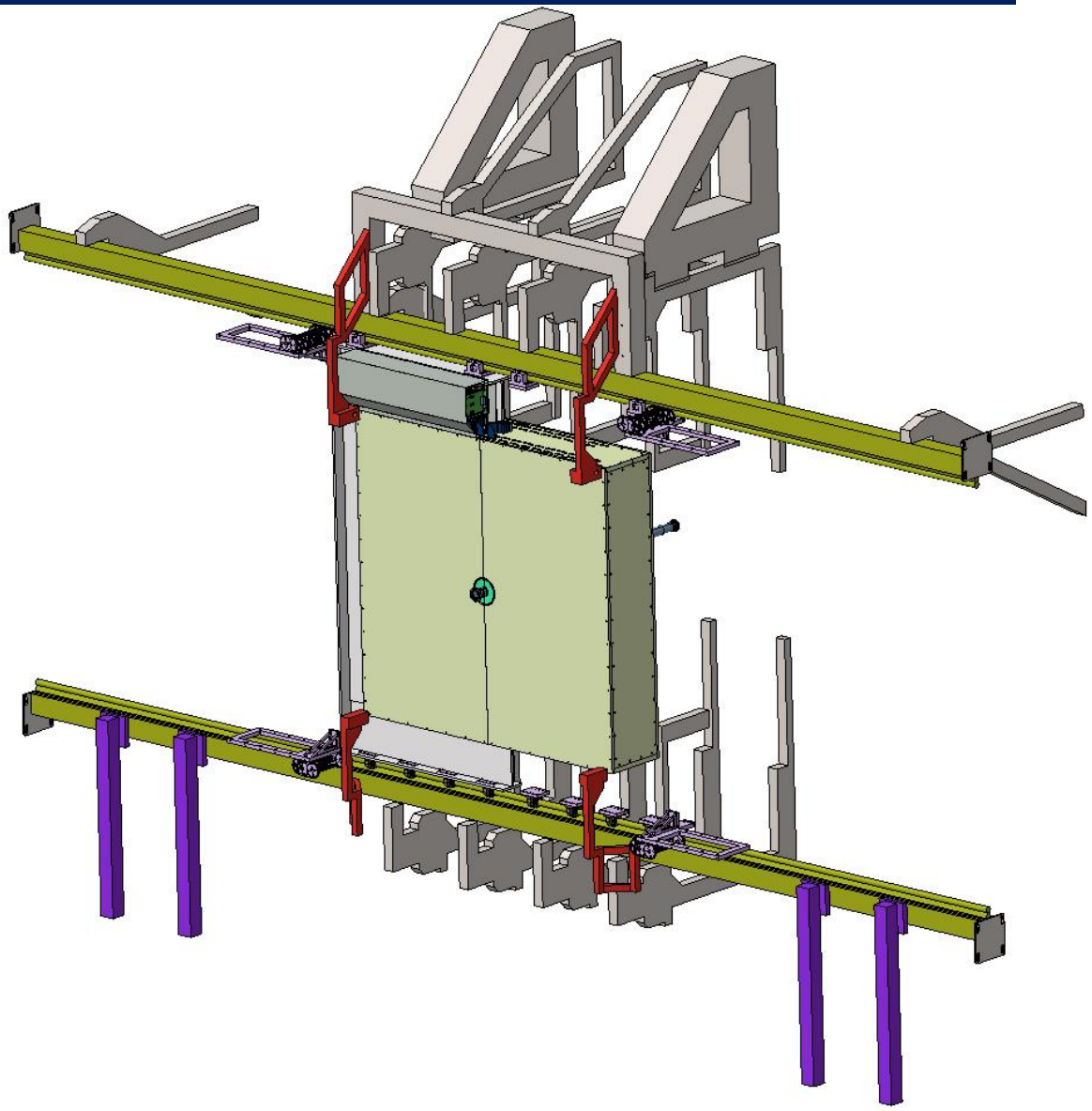
UT installation, based on TT layout

- The yellow parts will be re-used for UT (other items only as they seem useful)

- The sequence would be as follows:
  1. Put the infrastructure on the C-side (racks, chain, services etc.) in place
  2. Install the C-side detector box
  3. Install the A-side detector box
  4. Install/connect the infrastructure on the A-side
  5. The beam-pipe and the interface to the UT-box should be mounted only at the end

- A small crane is available in this detector area



New assembly hall at Point 8

C New LHCb Assembly Hall & Storage - roughly 485 m^2 – crane 30 t

- The UT group we request about 80m^2 of assembly space in this hall.
  - About half of it should be equipped with a clean room.
- In addition, space of about 20m^2 needs to be foreseen for a cooling plant, needed to carry out the required detector tests at room temperature (<20^oC)

UT Maintenance

- Some considerations:
  - Maintenance will be done in the cavern; it is NOT foreseen to bring the detector halves to the surface.
  - The detector will be carefully moved to the ‘maintenance position’.
  - All interventions, be it on the staves, the flex cables and other connections, or the PEPI electronics, will be carried out in this location.
  - The appropriate measure will have to be agreed upon.
    - This might include a sort of tent for work on staves with ‘semi-clean room’ conditions etc.

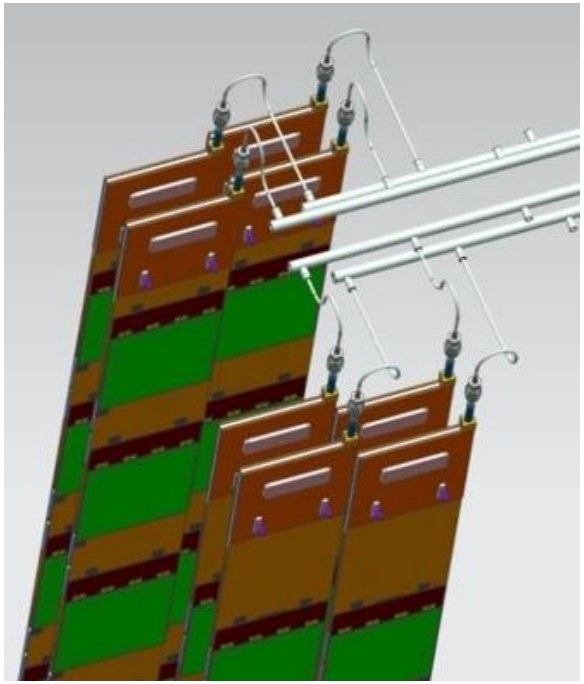
UT Assembly & Testing Plan

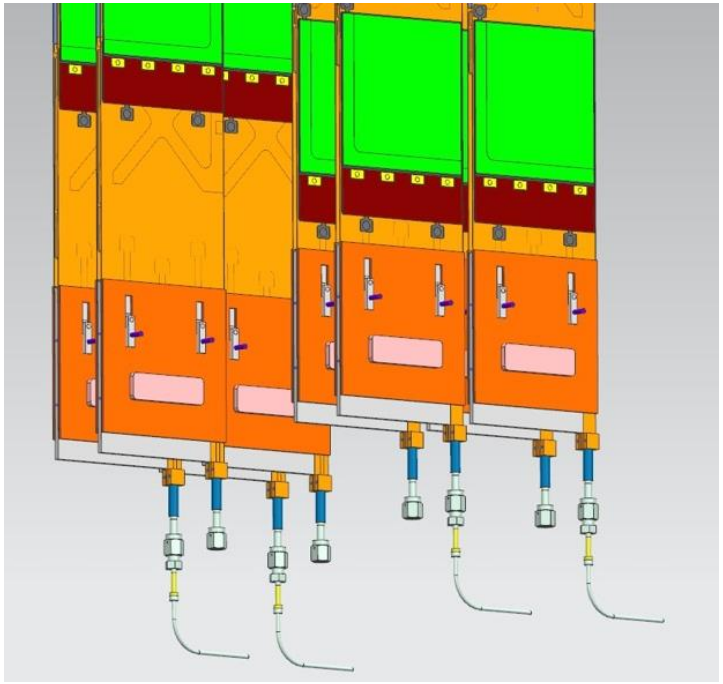
- Tentative stave assembly procedure:
  - Fully-populated staves shipped to CERN
  - Box half with frame and cooling manifold assembled and ready, has removable cover panels on open sides and dry air flush
  - Add single stave at a time, connect pigtail, connect cooling, mount to frame, power up, cool down, and read out in order to qualify stave for operation
  - Test stave (see below)
  - Add second stave, using same procedure, test
  - Repeat for all staves in four half-planes, working from beampipe region outward, populating planes U,V,X,X in order
  - ➢ **Ideally, test everything possible before lowering half-UT into pit**
- Proposed DAQ assembly:
  - DCBs will be housed in crates above the detector box.
  - They should be considered as part of the detector halves assembled on the surface
- Installation of LV and HV distribution:
  - LV and HV modules will be in the racks on the side of the detector or further away on the 'balcony' and installed independent on the detector halves
  - Some LV and HV will be needed on the surface for testing
  - Use some modules first there before installation in the cavern

Backup

UT cooling needs during assembly & testing

- The staves will be installed 1 by 1
  - About 53-75 W per stave, depending on position in the detector
  - after each stave assembly, a cooling cycle will be performed for tests
  - 16+16 staves in ‘a’ layers and 18+18 staves in ‘b’ layers;
  - 68 staves in total; 34 staves per detector box
- Each box has 4 manifolds (for the inlet)
  - 2 manifolds per LUCASZ loop; about 850 W per manifold
  - The whole detector half/box need to be tested at the end





Performance parameters for a $C0_2$ plant on the surface for assembling and commissioning

Parameters	unit	CMS	LHCb
Cooling loop max flow	g/s	14	10
Total plant flow	g/s	max. 20	20
Min evaporating T	^oC	-25	-25
Max evaporating T	^oC	+15	+15
Number of cooling loops	#	2	2
Max Δp across cooling loop	bar	<20	<20
Cooling loop max power	W	810	850
Plant max power	W	1500	1500
Transfer line length	m	18	15

- Joint development with CMS