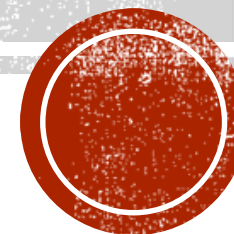


MANUAL VELO X MOVEMENT

By: Freek Sanders

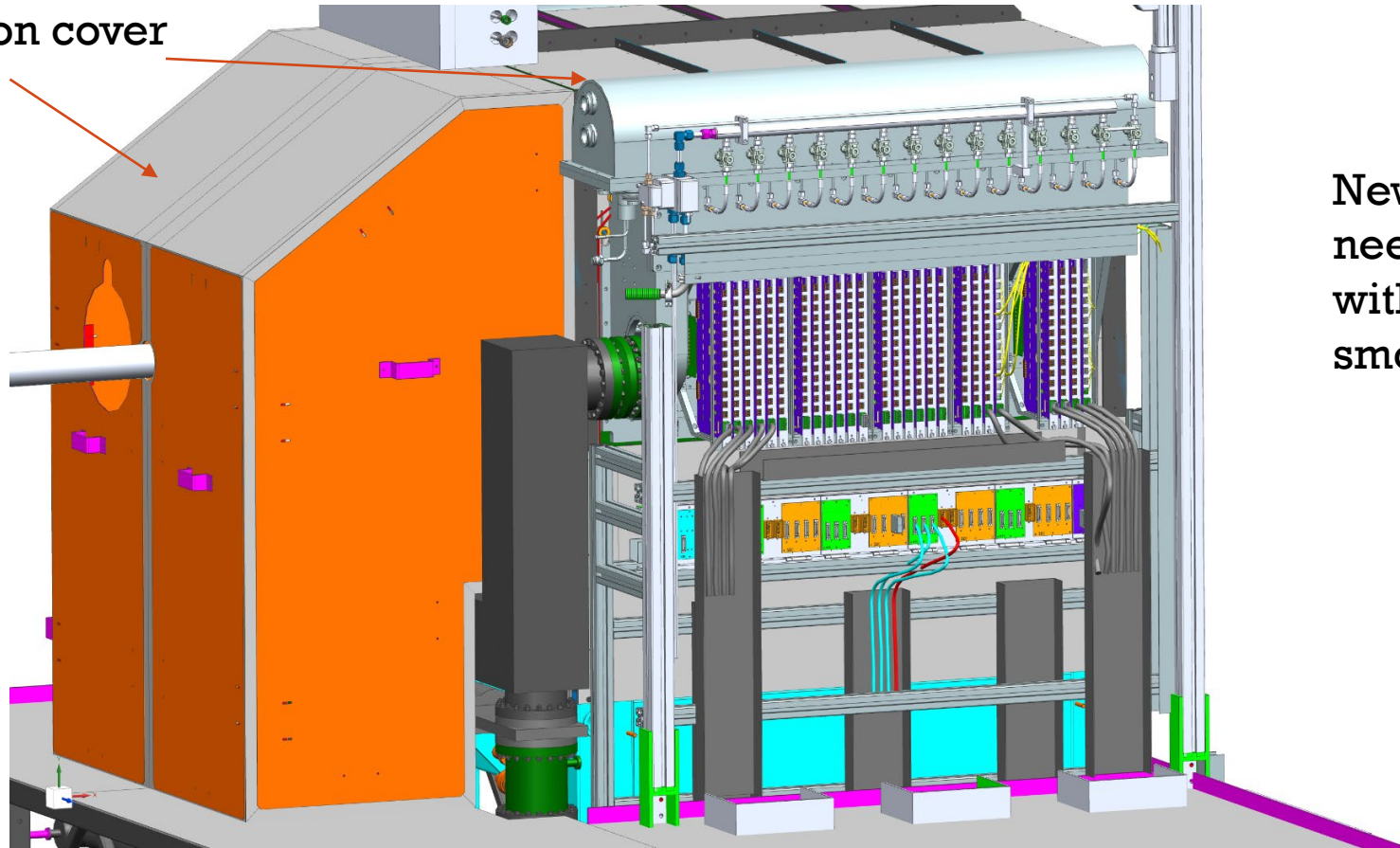


THE PROBLEM

- Control hardware failed. Spare was not compatible due to different component. Whole problem took 0,5 days to fix.
- The question arose, can you move the Velo manual.
- Manual movement with 'old' Velo was difficult due to dust/protection cover it was difficult to reach the drive belt

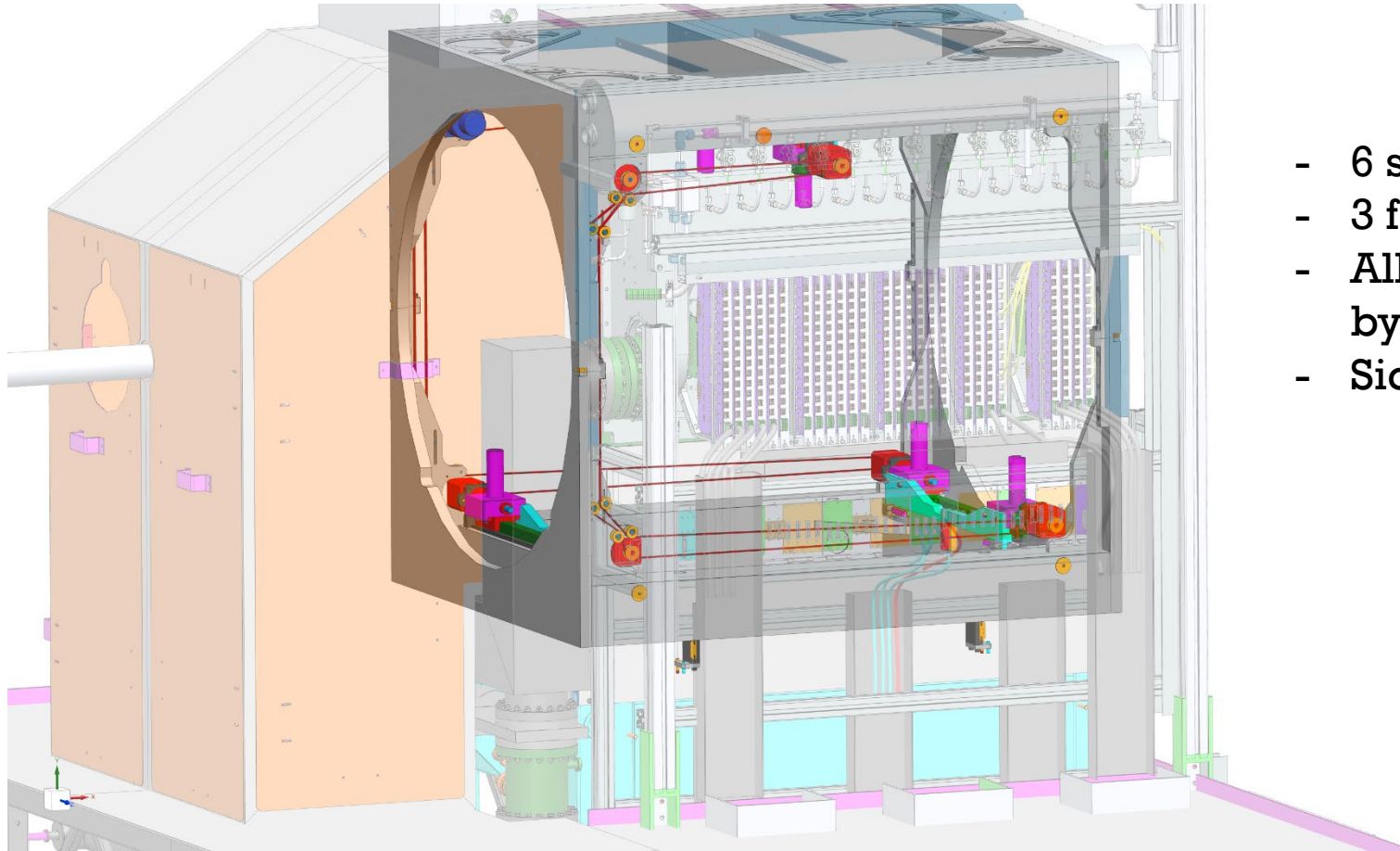
THE UPGRADED VELO

Old dust/Protection cover



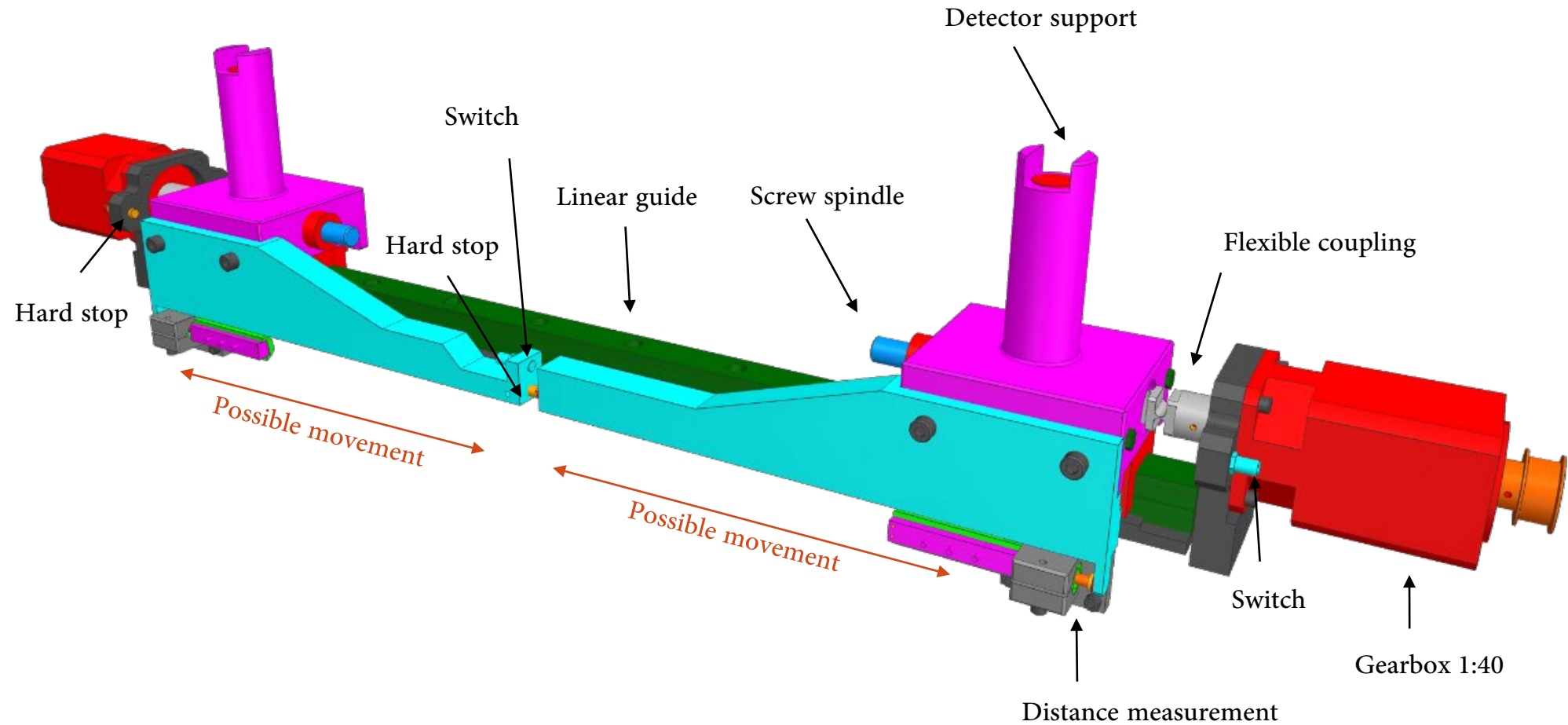
New dust/protection cover needed due to conflict with new vacuum and smog2 equipment

THE X MOTION SYSTEM

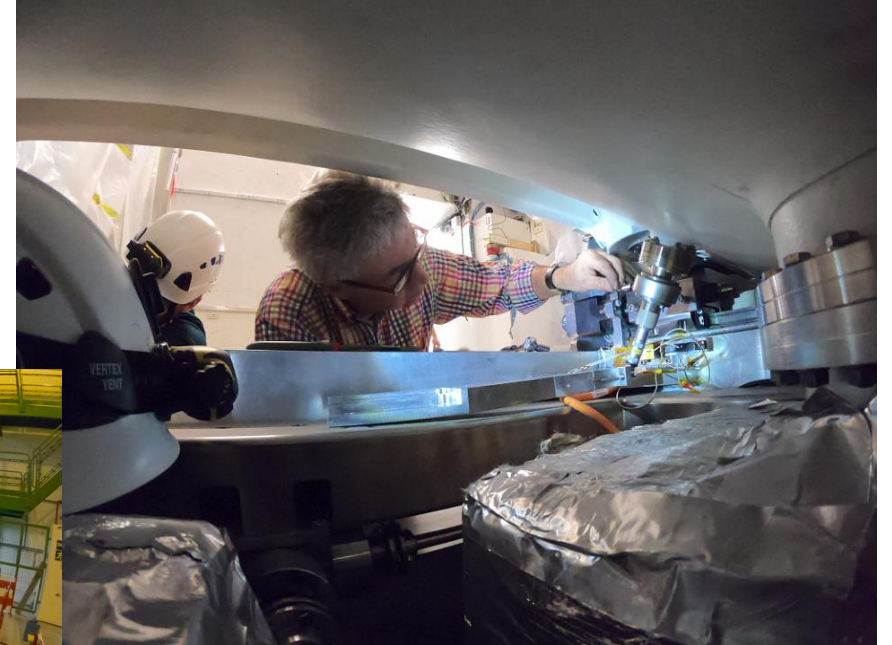


- 6 stages
- 3 for each side (A & C side)
- All 3 on one side move together, by a belt
- Sides can move independent

2 STATIONS WORKING TOGETHER



MAINTENANCE ON X MOVEMENT SYSTEM



- Visual inspection of parts
- Changed tooth belt
- Changed flexible coupling

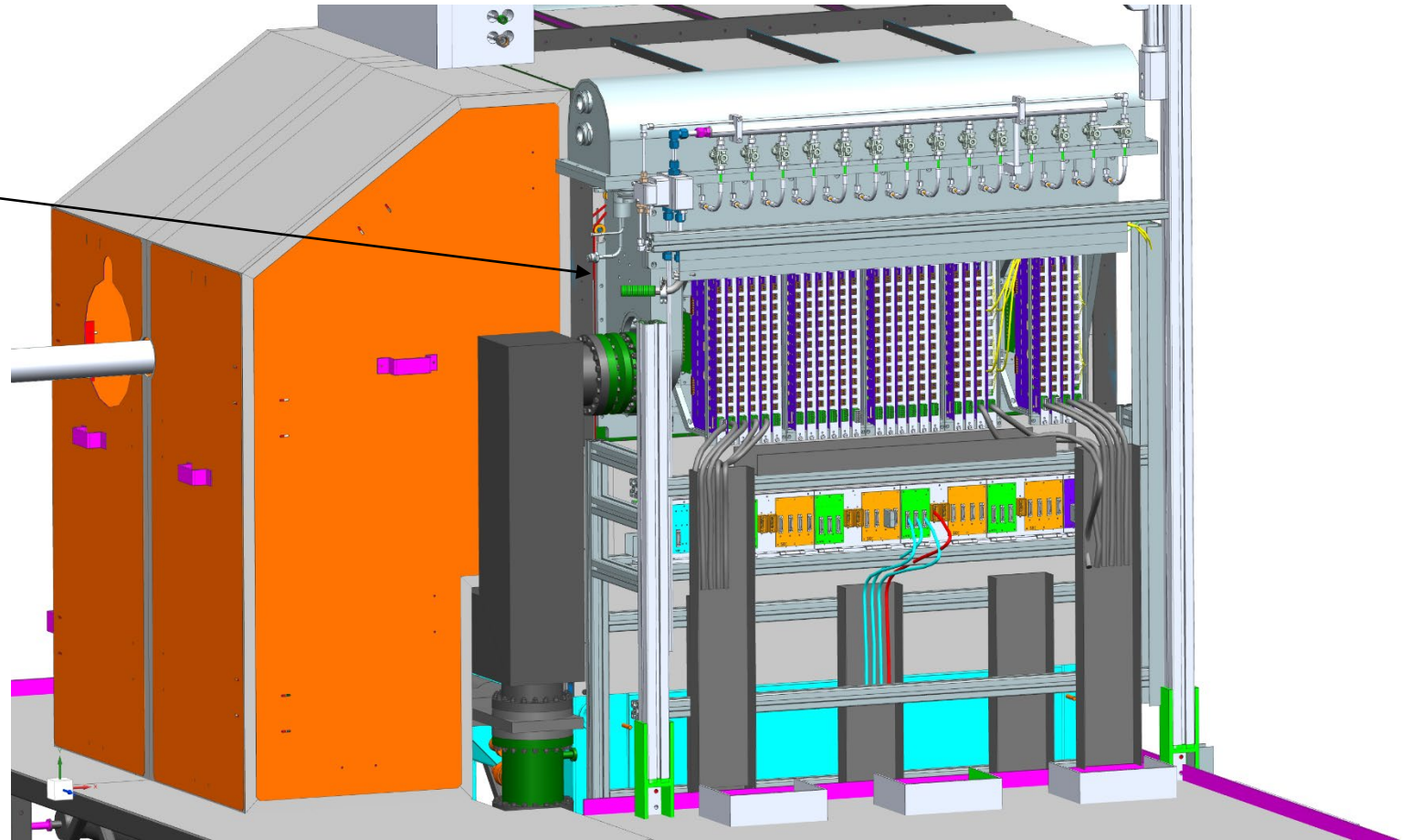


WHEN DO WE WANT MANUAL RETRACTION?

- Never!
- Highly sensitive operation – 1 day.
- Strenuous operation, difficult to reach.
- High radiation zone.
- No interlocks!
- Velo expert needed. a lot of different sensitive equipment around.

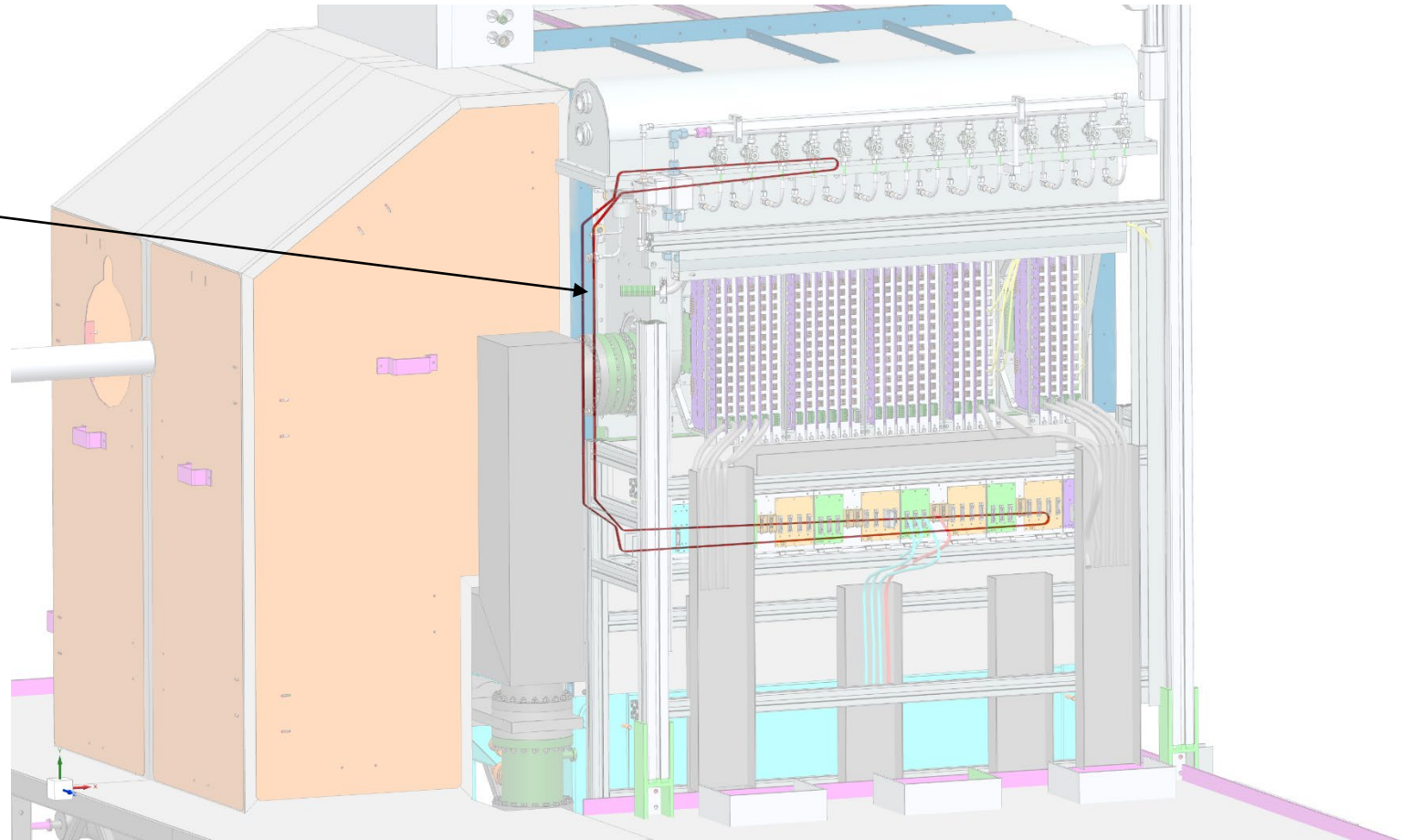
THE VELO

The belt to be moved by hand
(its red)



THE BELT TO BE MOVED MANUALLY

The belt to be moved by hand
(its red)



CAN YOU REACH THE BELT?

- Yes, but applying force is not easy. It is however doable. To get the Velo out $100\text{ mm} \cong 1\text{ revolve} = 50\text{ }\mu\text{m} = 2000\text{ steps}$
- To move out we need to move $30.000\text{ }\mu\text{m}$, not necessary the minimal safe distance.
- This equals to 60 meters. Can be don in steps of 100-150 mm.
- Can be done within an hour



MANUAL MOVEMENT*

- Done during the de-installation of the old RF foils.
- <https://www.nikhef.nl/pub/departments/mt/projects/lhcb-vertex/RemovalInterior/#RemovalEntireInteriorVELO.mp4>
- Time 2:40

* No detector installed.

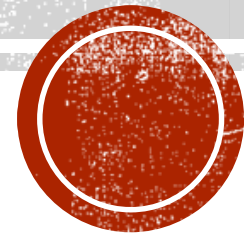


Original designer of the Velo moves the Velo by hand

IMPROVEMENTS:

- Add open/close directions on the frame where belt can be reached.
- Test access to the belt during further installations.
- Do not put old dust cover back, this prevents access to the belt. But this we planned already not to do.
- Save document (powerpoint/note on edms)

QUESTIONS?





BACK-UP

