Hamburg pipe project status

Benoît Florins, Krzysztof Piotrzkowski, Guido Ryckewaert
Université Catholique de Louvain

- HPS design choice

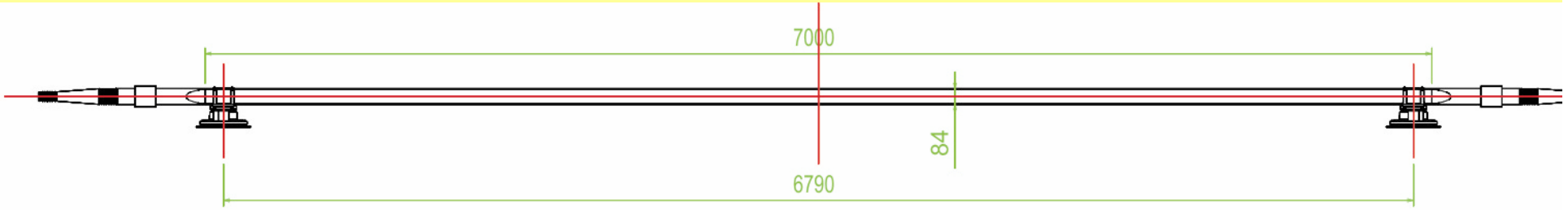
Three configurations/motorizations considered, and four shapes of pockets:

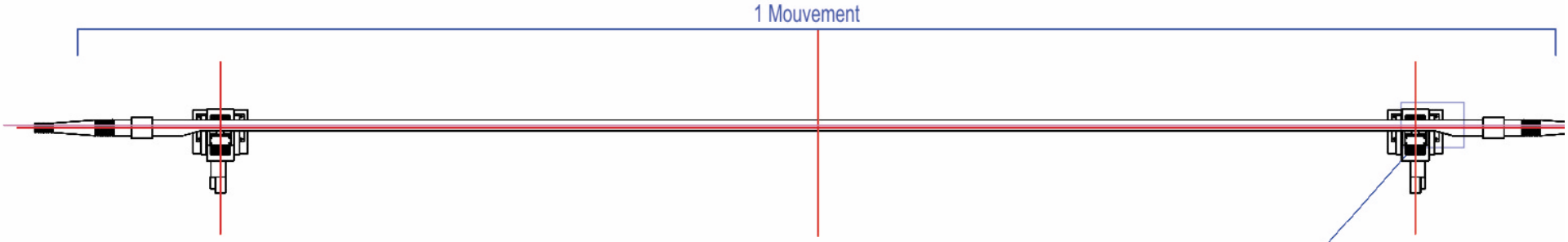
We need to make decision very soon based on impact on LHC beam, mechanical aspects, integration into cryostat, detector performance/integration, finally accessibility and safety

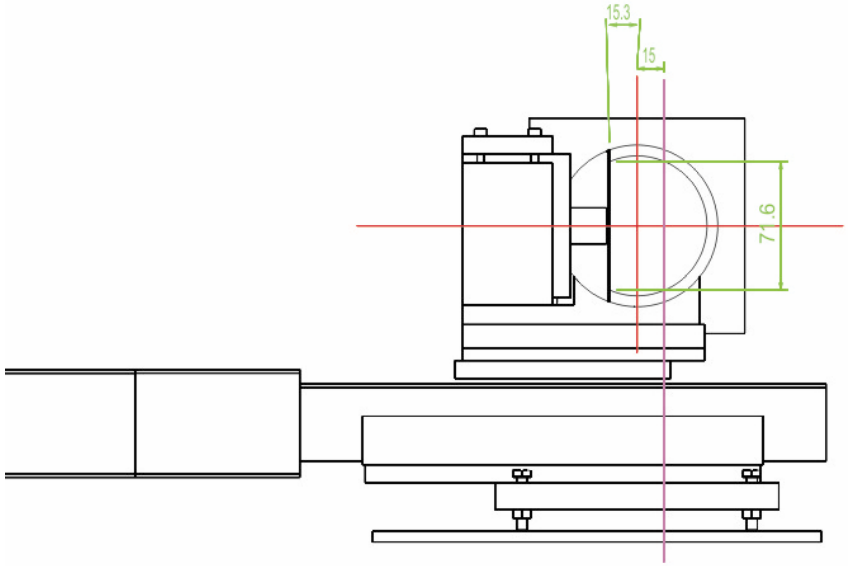
Four scenarios assuming:

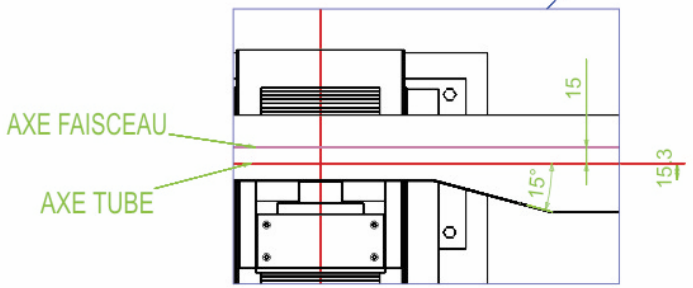
- Four detector stations
- Stations with extended length (~20cm)
- Tracking detector cross-section 20x30 mm (and 40 mm thick)
- Displacements by up to 30 mm

One long indent









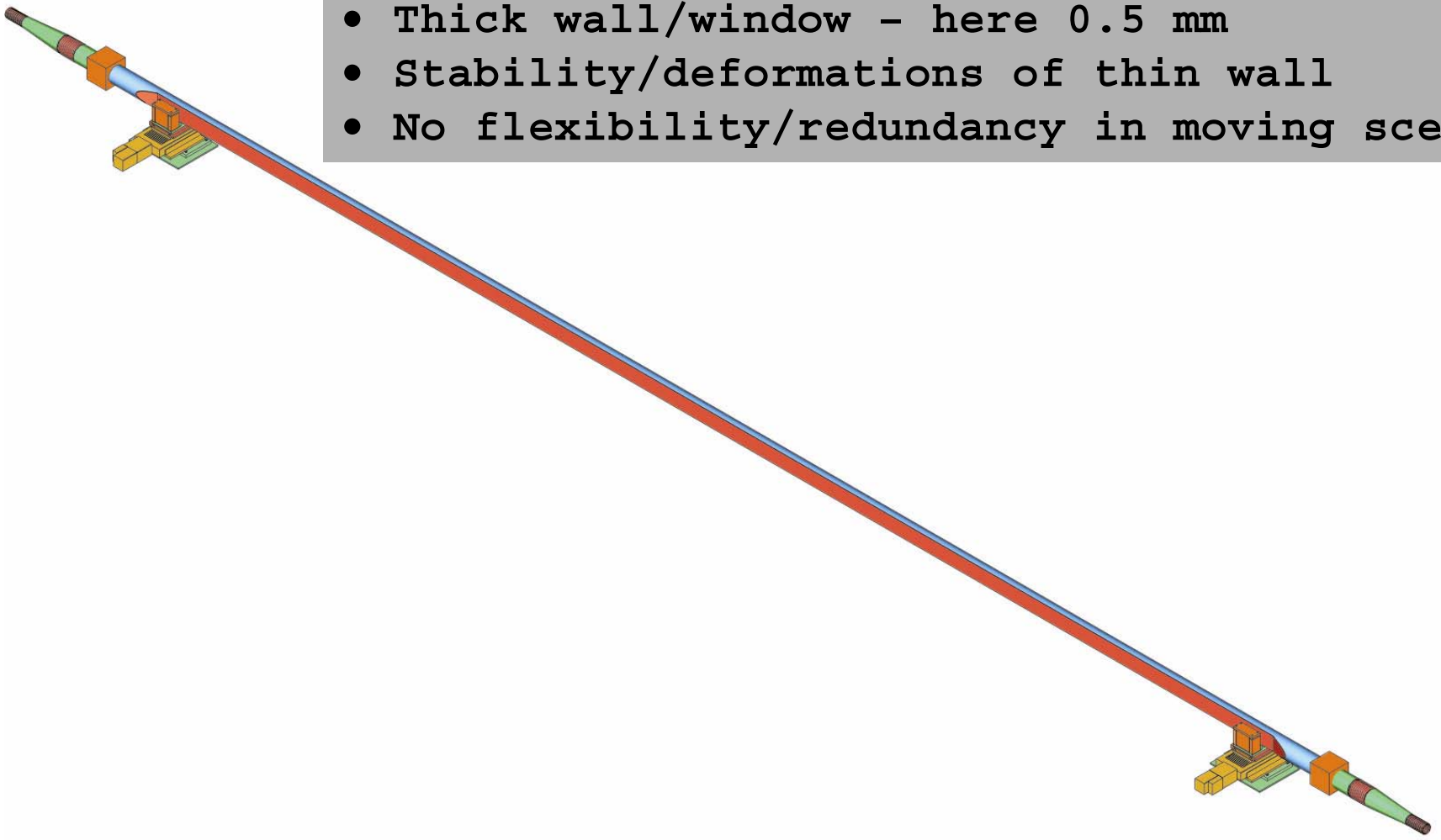
Découpe sur 7m de long
Autant de détecteurs que l'on veut
Déplacement sur 2 moteurs

Pros:

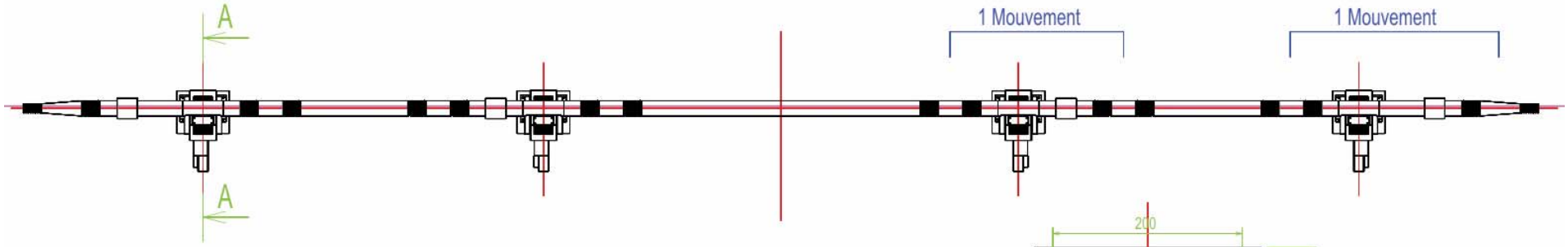
- One simple structure
- Only one entrance window
- Flexibility in number of detectors/positions

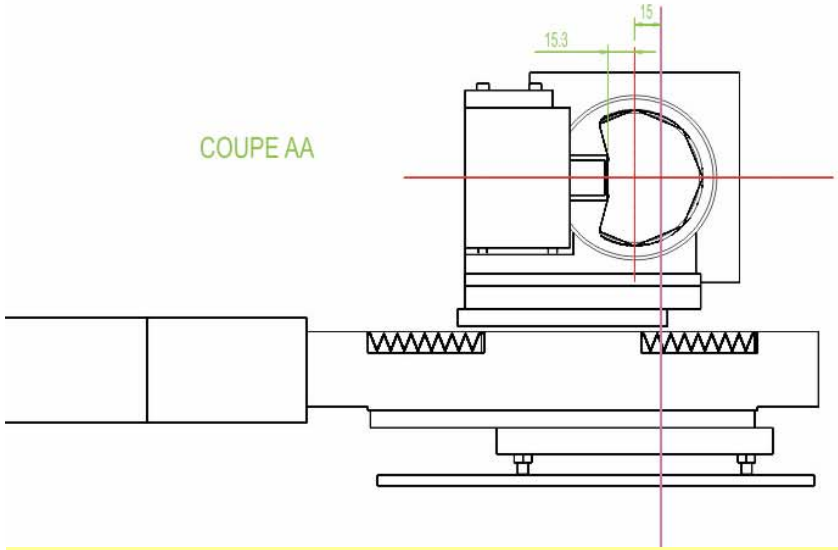
Cons:

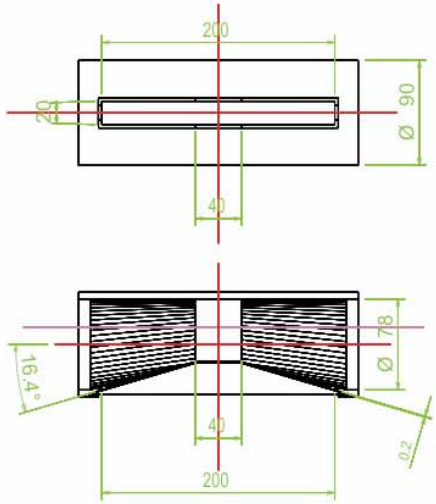
- Thick wall/window – here 0.5 mm
- Stability/deformations of thin wall
- No flexibility/redundancy in moving scenarios



Four independent stations/sections







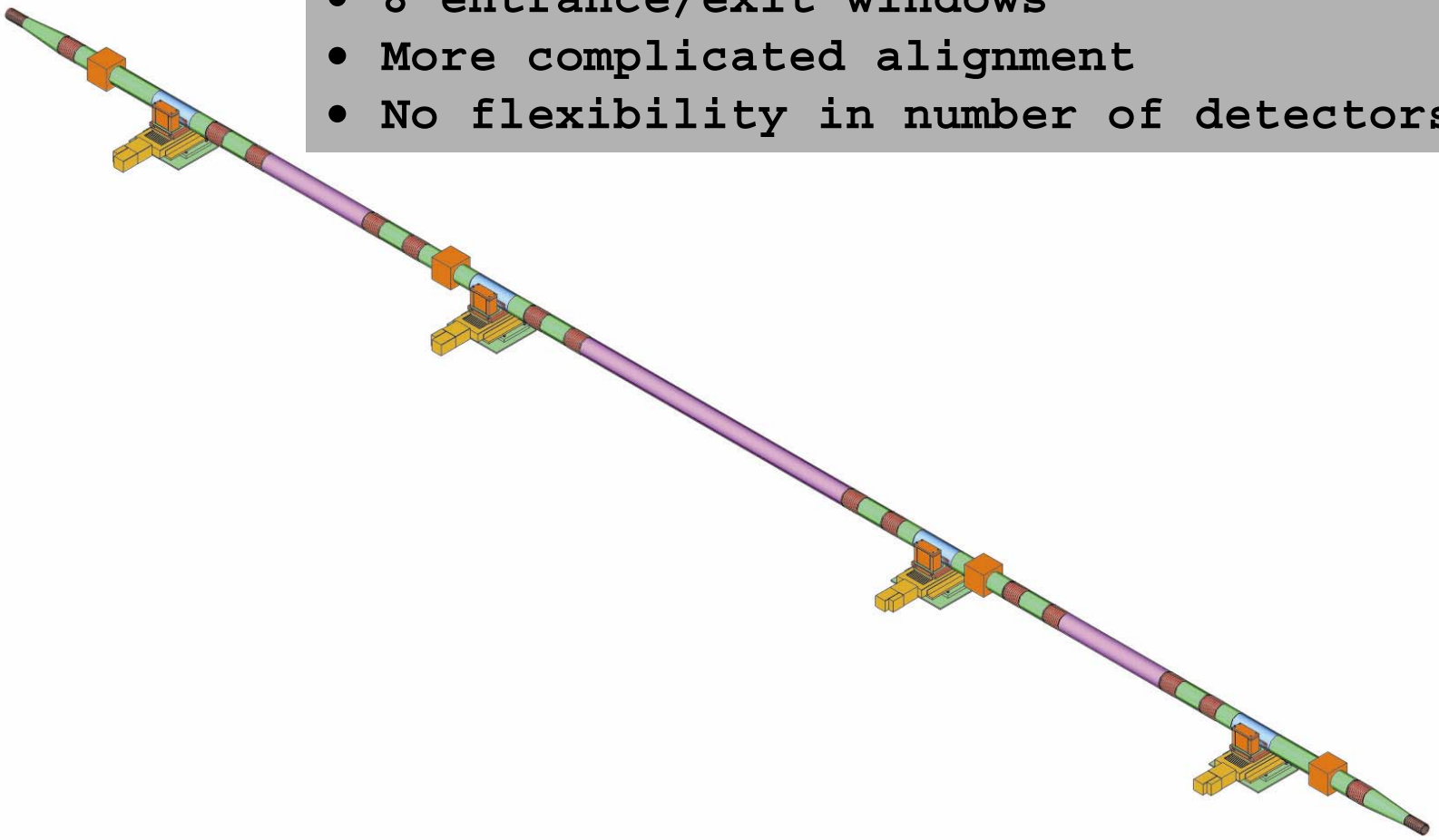
Autant de découpe qu'il y a de détecteurs
Autant de moteurs qu'il y a de détecteurs
Ici, avec 4 détecteurs et donc 4 mouvements

Pros:

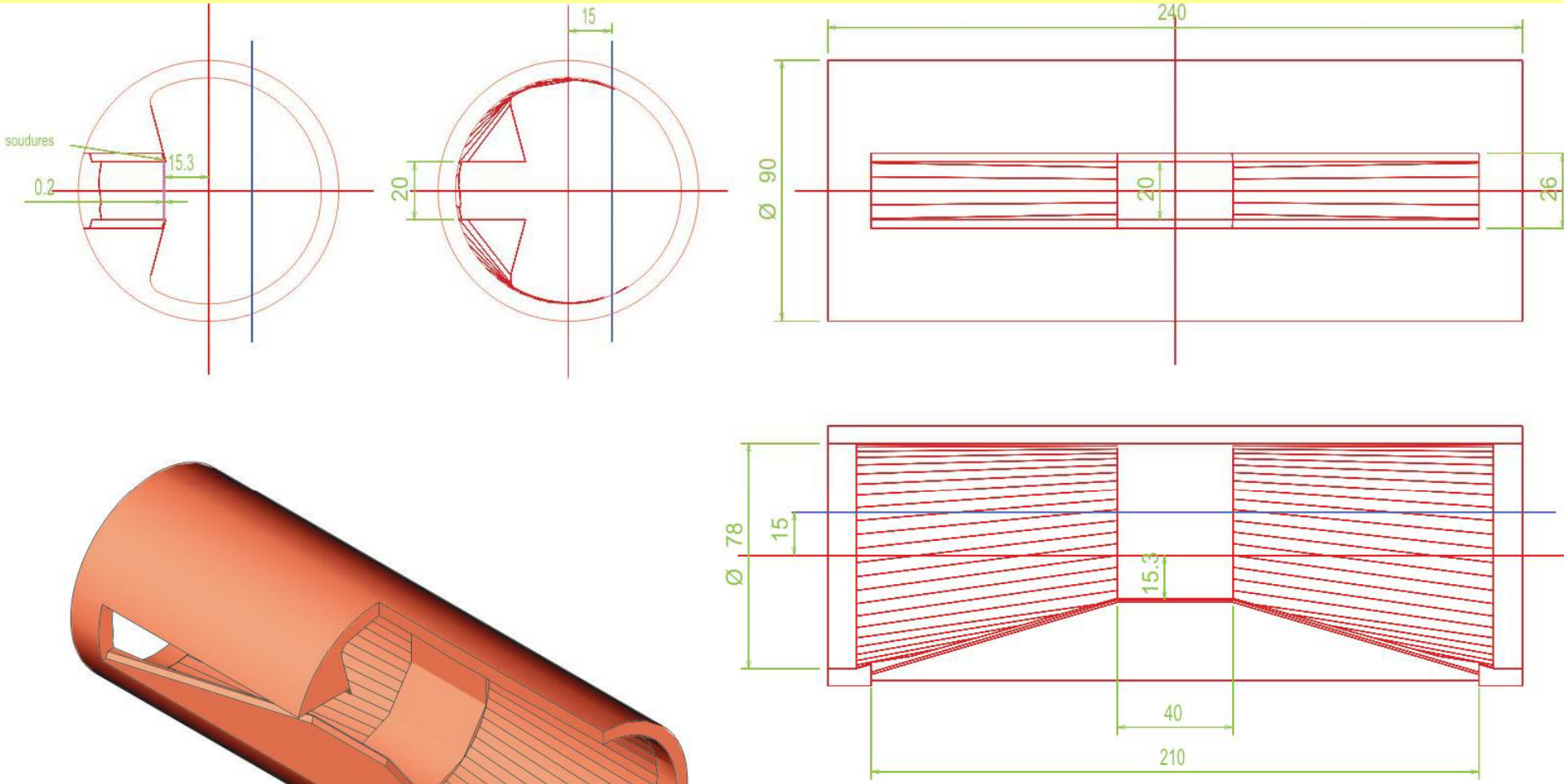
- Four identical (?) structures (each w/ BPM?)
- Thin wall/windows – here 0.2 and 0.3 mm
- Flexibility/redundancy in moving scenarios

Cons:

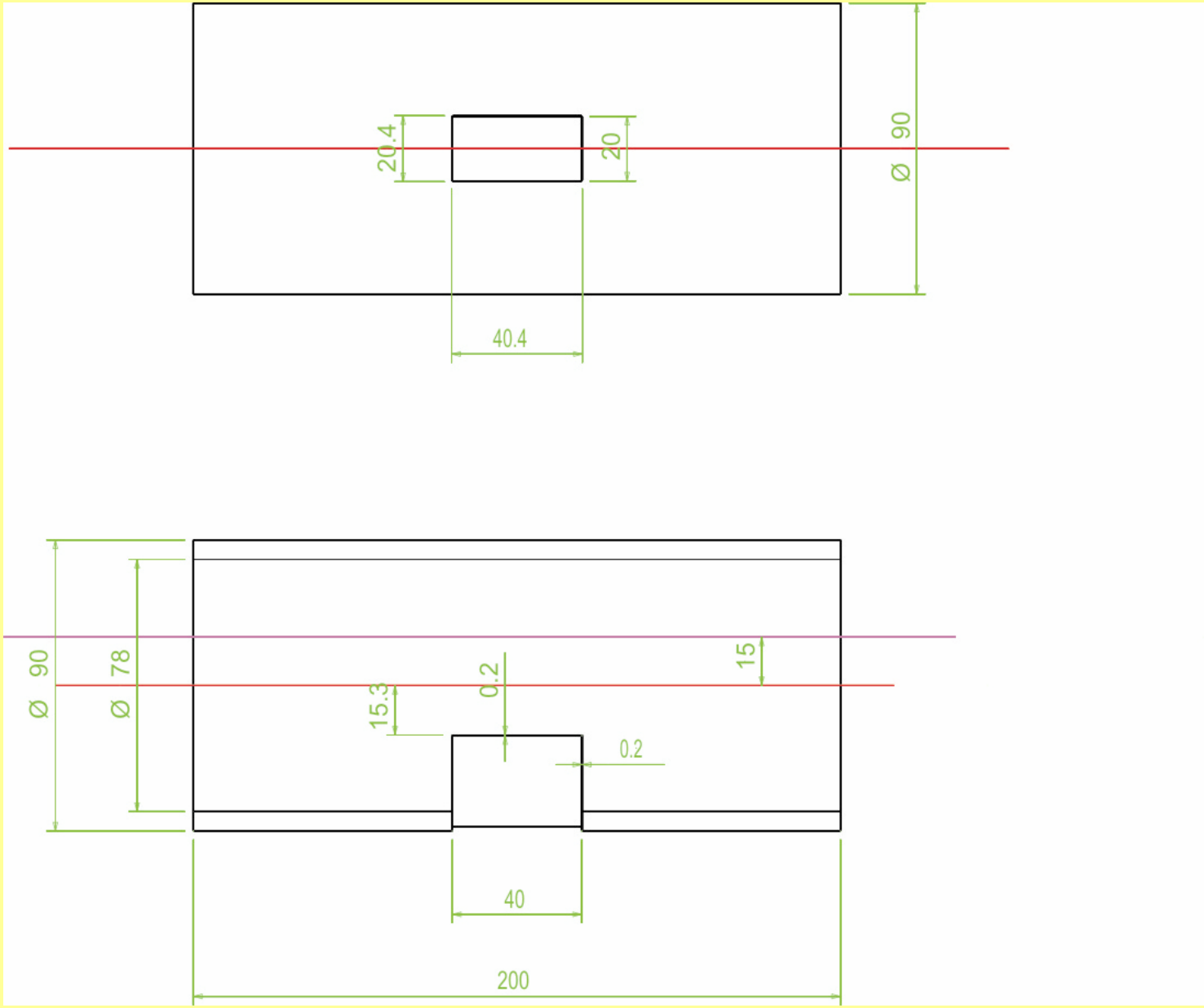
- 8 entrance/exit windows
- More complicated alignment
- No flexibility in number of detectors/positions



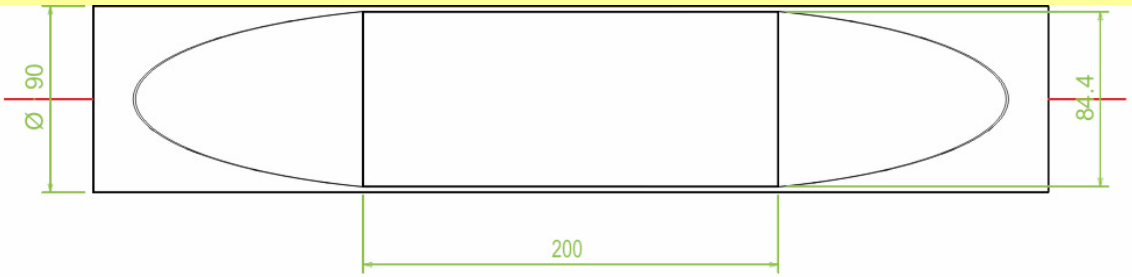
Small pocket: thin walls of 0.2 mm

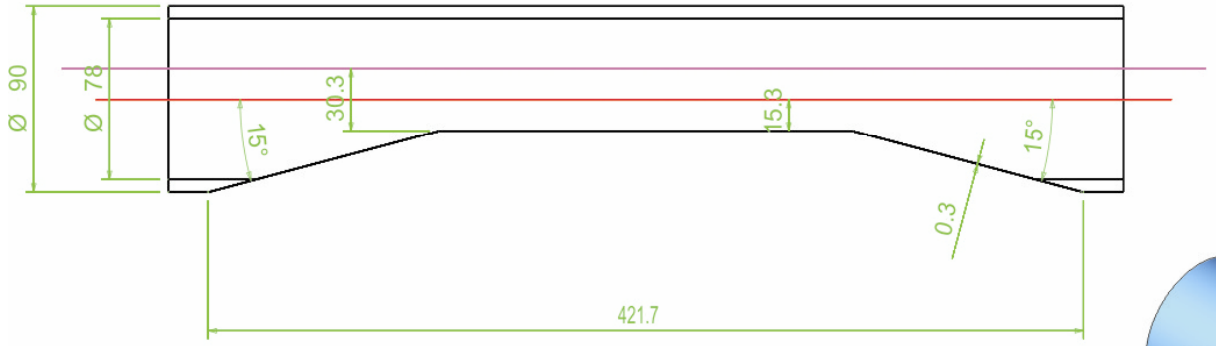


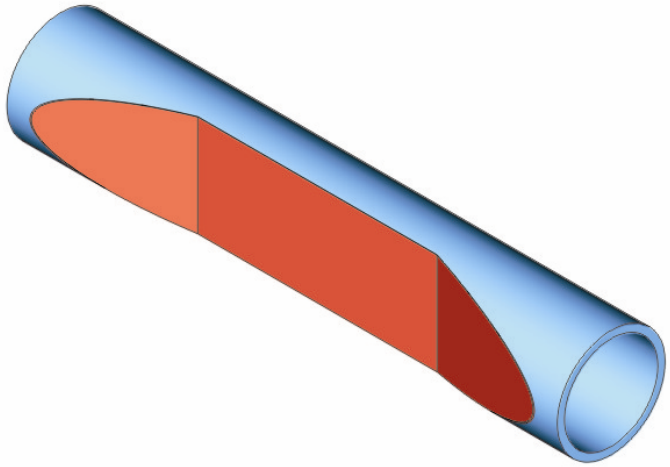
Small rectangular pocket: thin walls of 0.2 mm



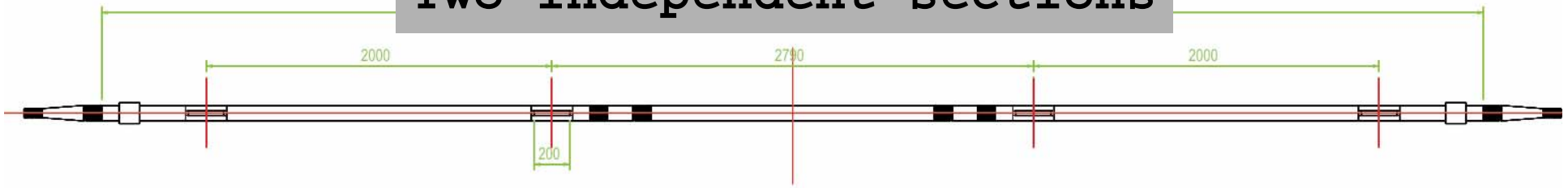
Long pocket: thin walls of 0.3 mm

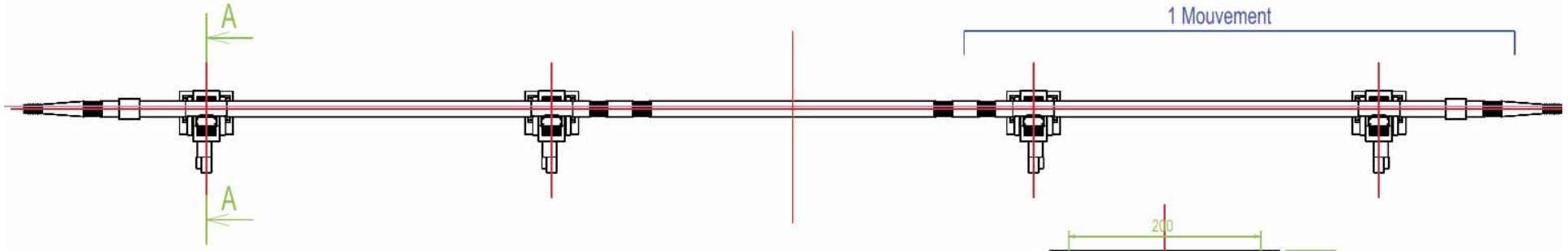


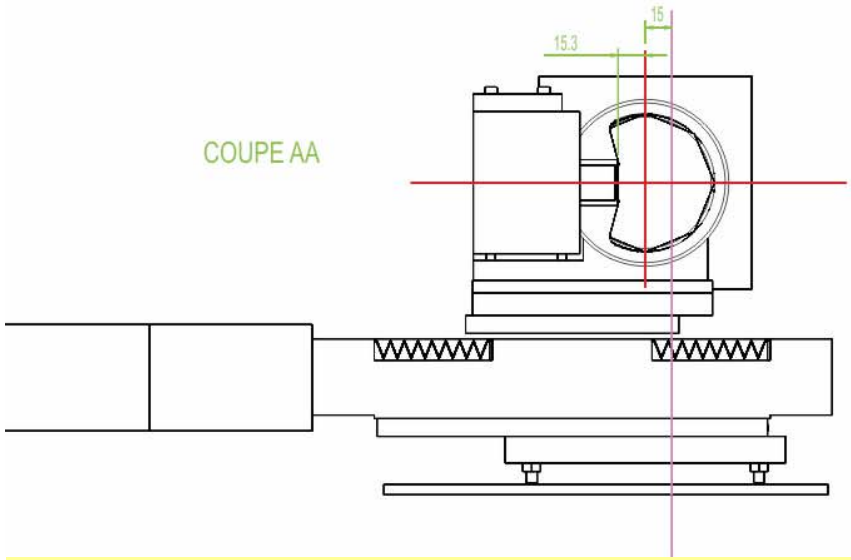


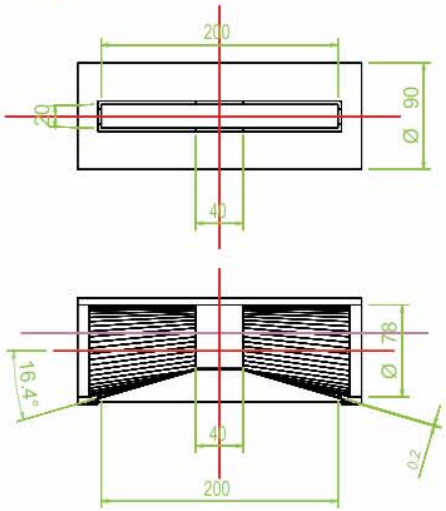


Two independent sections









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Autant de moteurs qu'il y a de détecteurs
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Pros:

- Two identical (?) structures (each w/ BPM)
- Thin wall/windows – here 0.2 mm
- Some flexibility/redundancy in moving scenarios

Cons:

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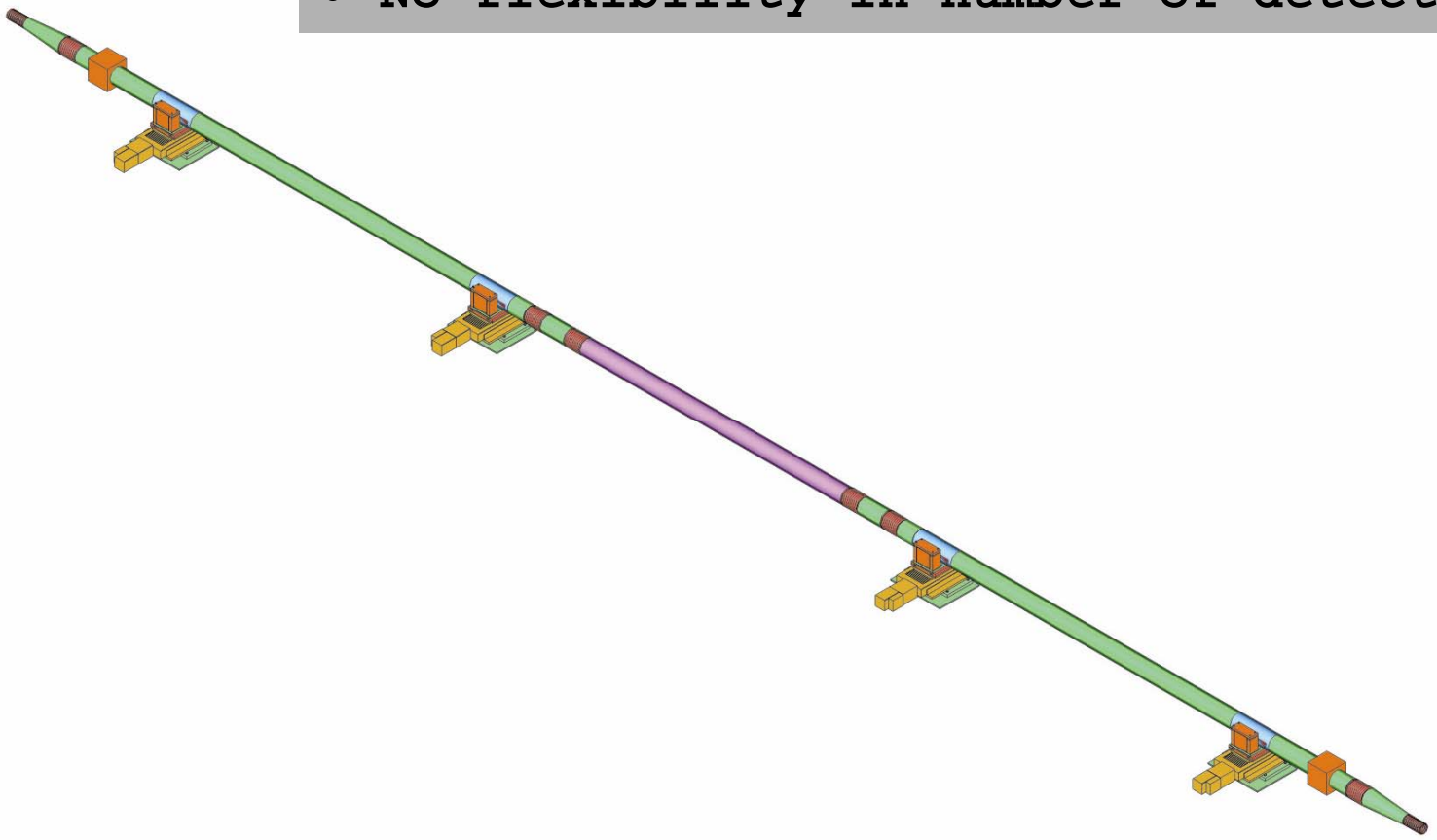
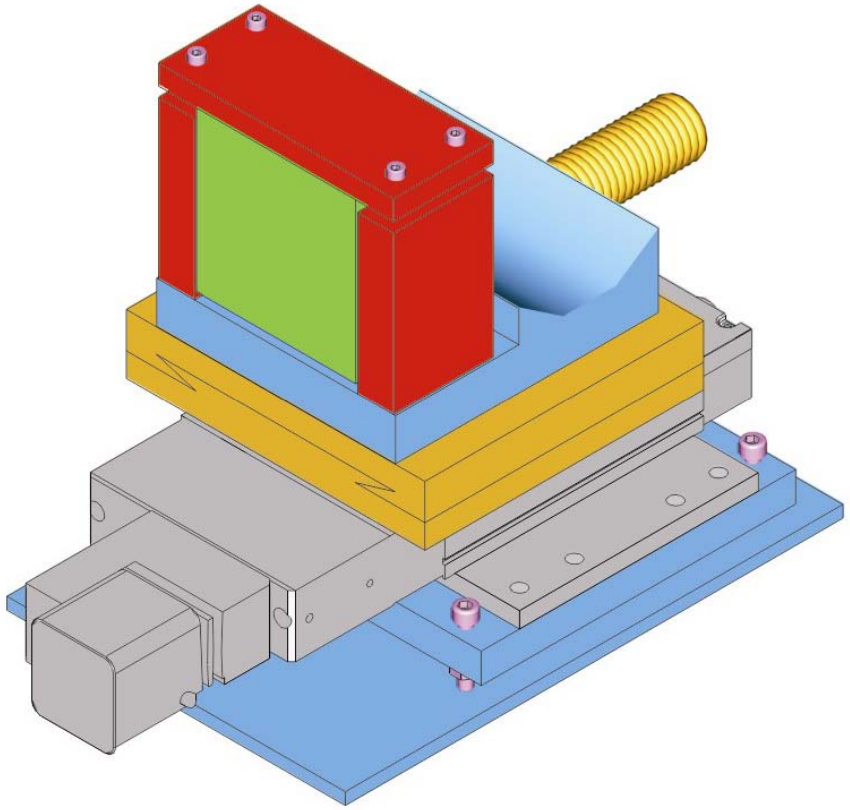
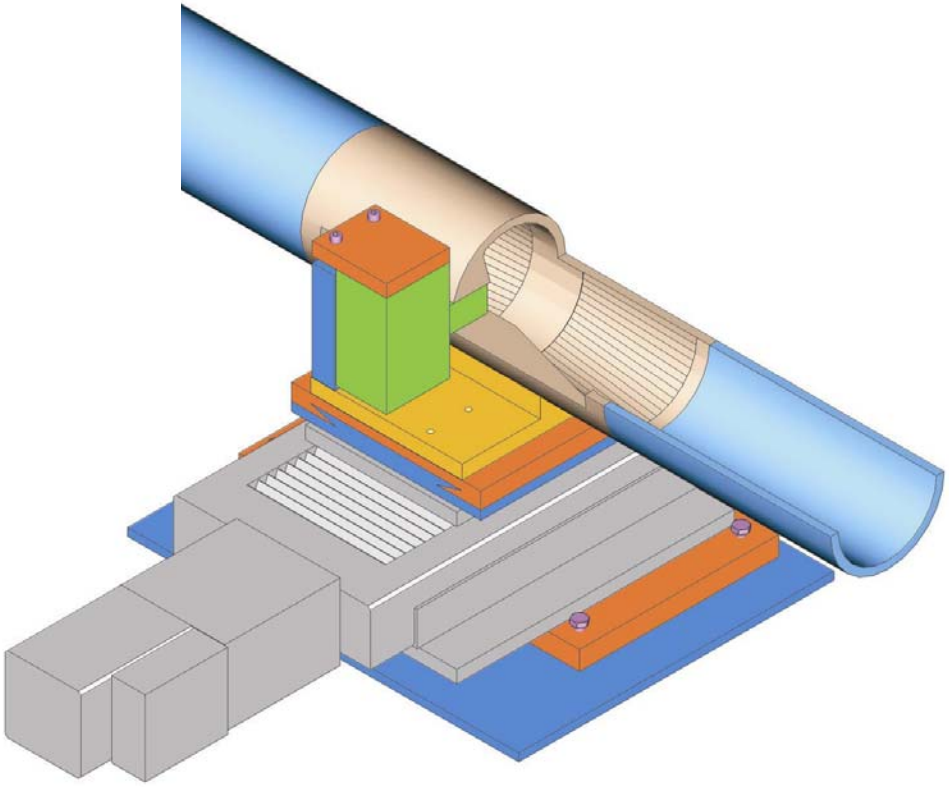
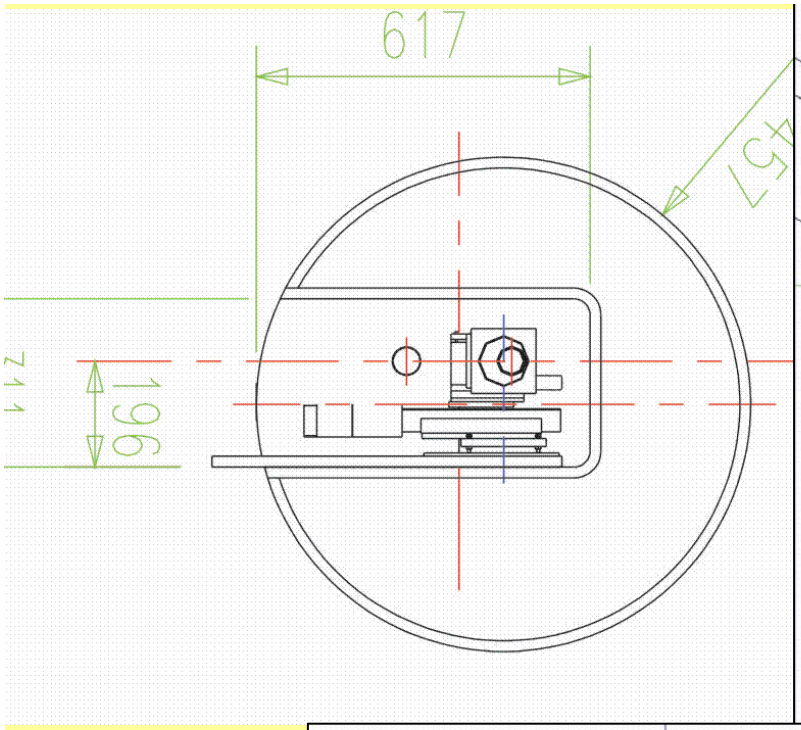
- No flexibility in number of detectors/positions





Detector fixing/support/ positioning/security

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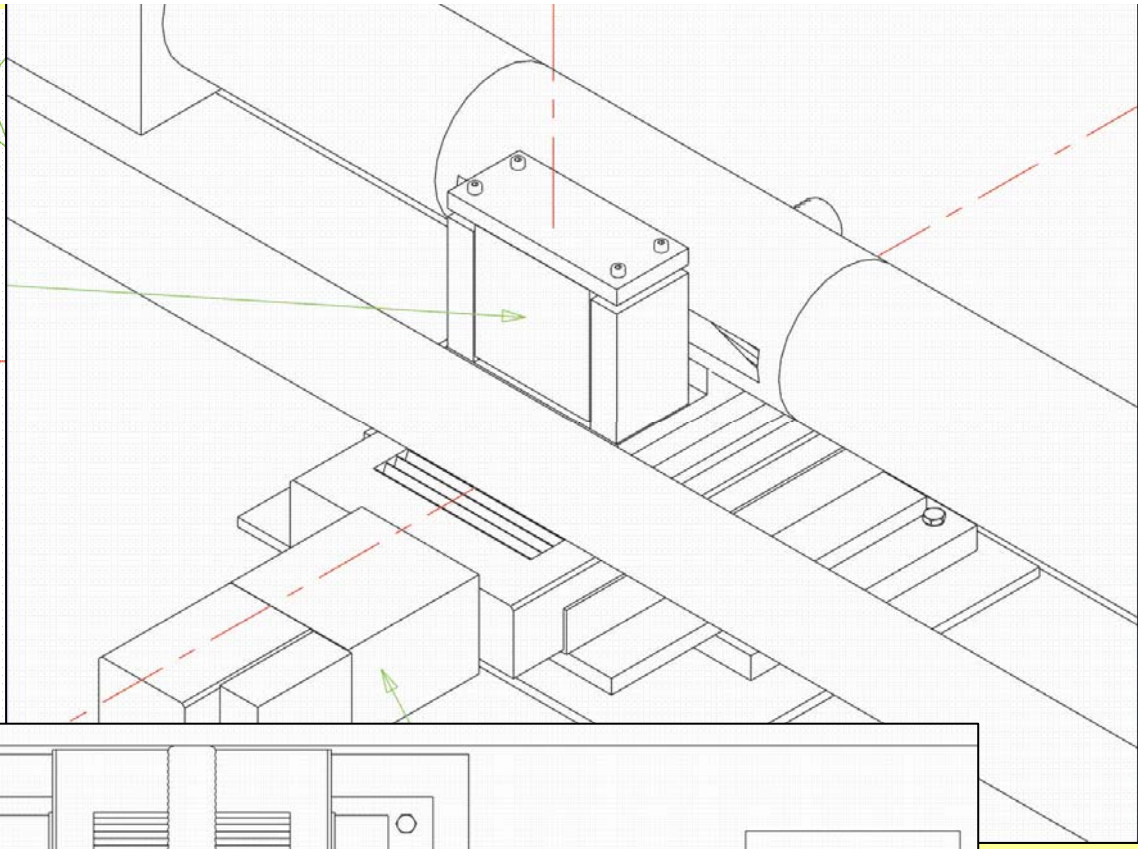

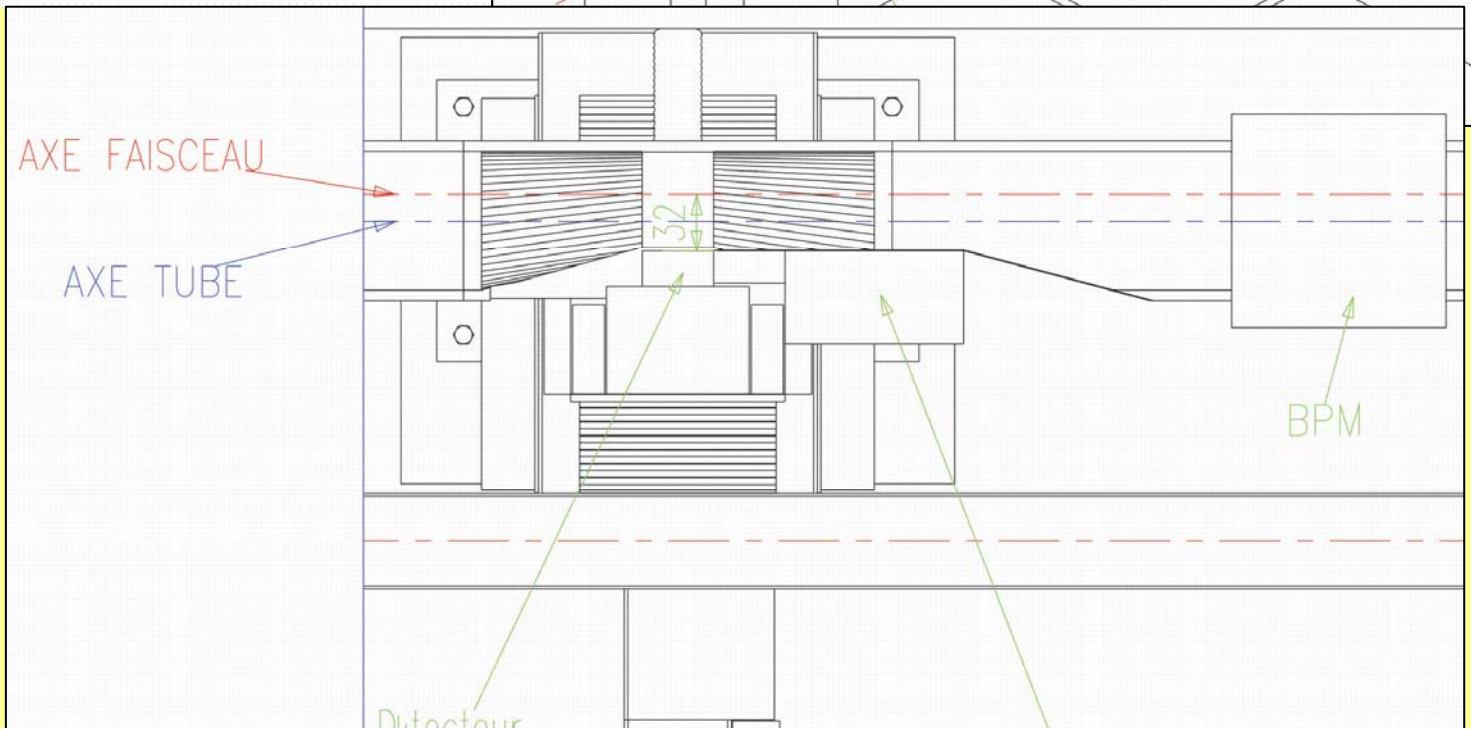
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BPM

For discussion

To make decision needs to evaluate:

- impact on LHC beam – RF studies (pocket shape),
- mechanical aspects – precision, stability,
- integration into cryostat,
- detector performance (resolutions)/integration (cooling),
- accessibility and safety

Next steps

Given dimensions and shape of volume for HPS in CC, design will be further continued…

Plan to make first prototypes of pockets asap: urgently need decision on preferred scenario

Then, various lab tests will follow:

- **Vacuum/leak tests**
- **Temperature cycles**

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