

HH pipe project – long scenario



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- HPS design choice

Several configurations/motorizations and shapes of pockets are possible:

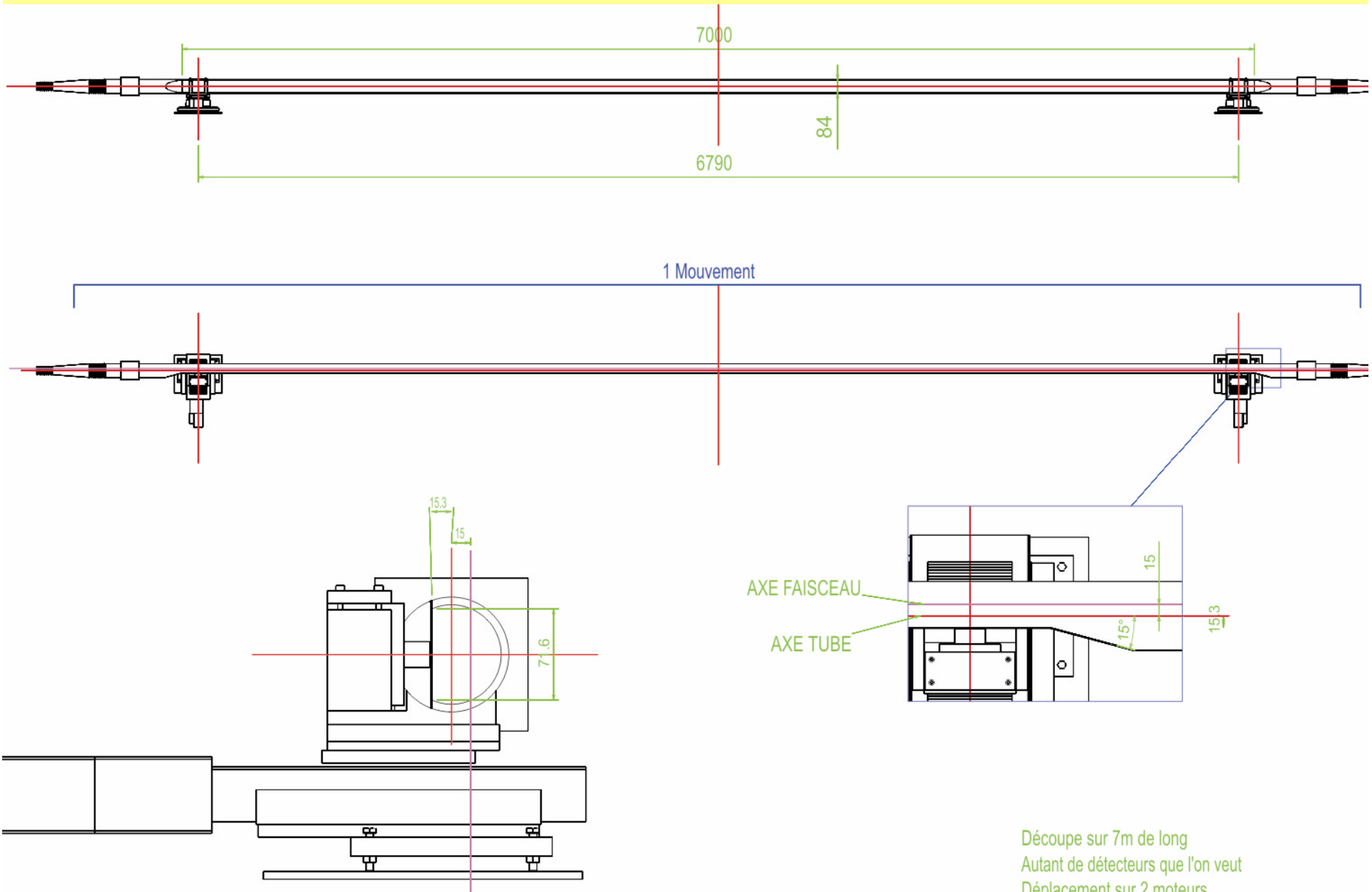


Propose that long pipe (à la HERA) is nominal HPS solution now, unless other option proves to be better - try to design in modular form, giving flexibility to make design modifications

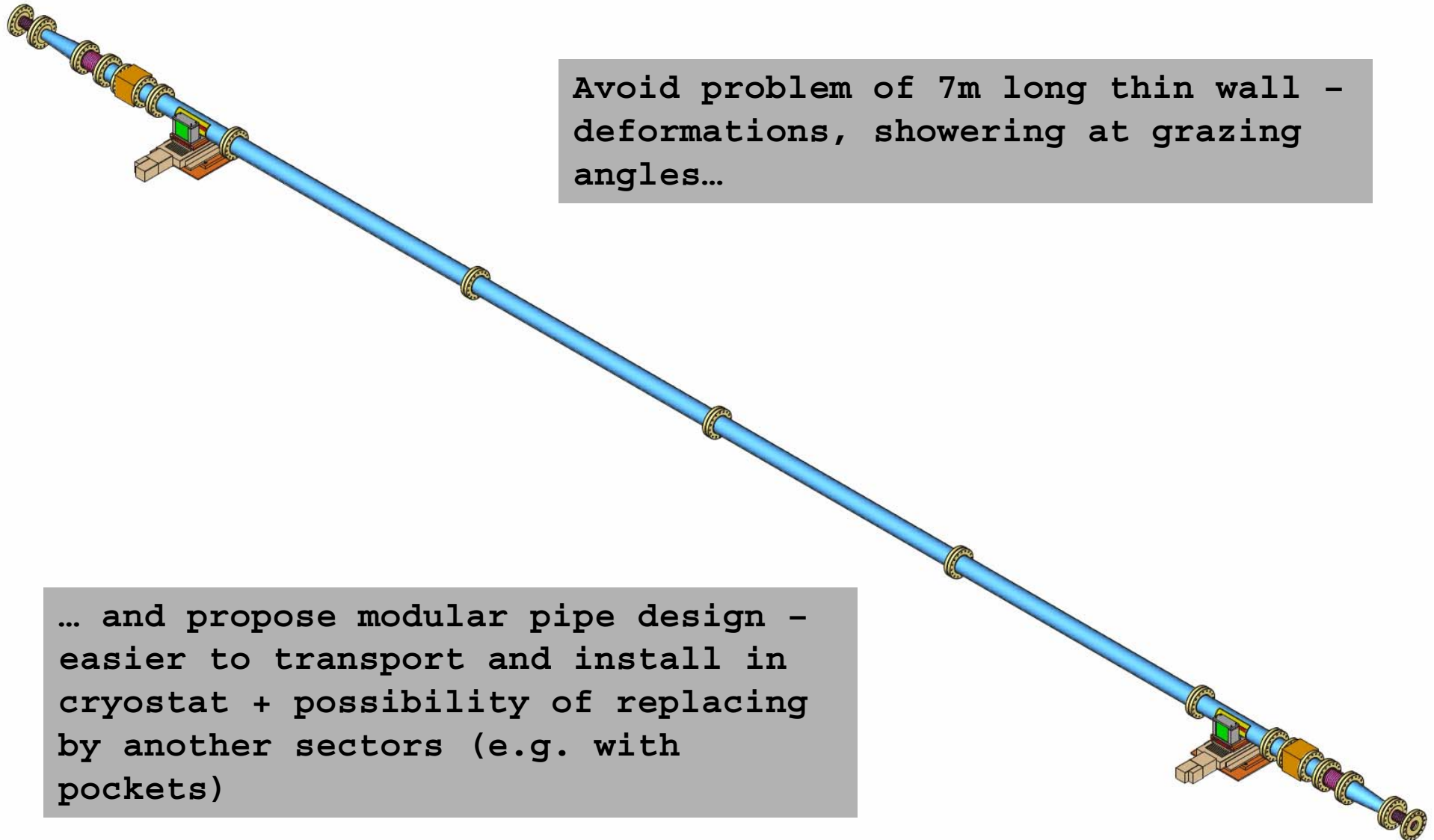
Long scenario:

- Two detector super-stations (= two station displaced by at least 20 cm, and possibility of ToF between)
- Pockets with extended length (≥ 20 cm)
- Tracking detector (and ToF) next to flat thin metal wall
- Displacements by up to 30 mm using two motors - easy to operate by LHC (note: >5 years of routine operation at HERA without any problem, using HERA collimator controls)

One long indent: original proposal



Two long pockets: present proposal



Avoid problem of 7m long thin wall - deformations, showering at grazing angles...

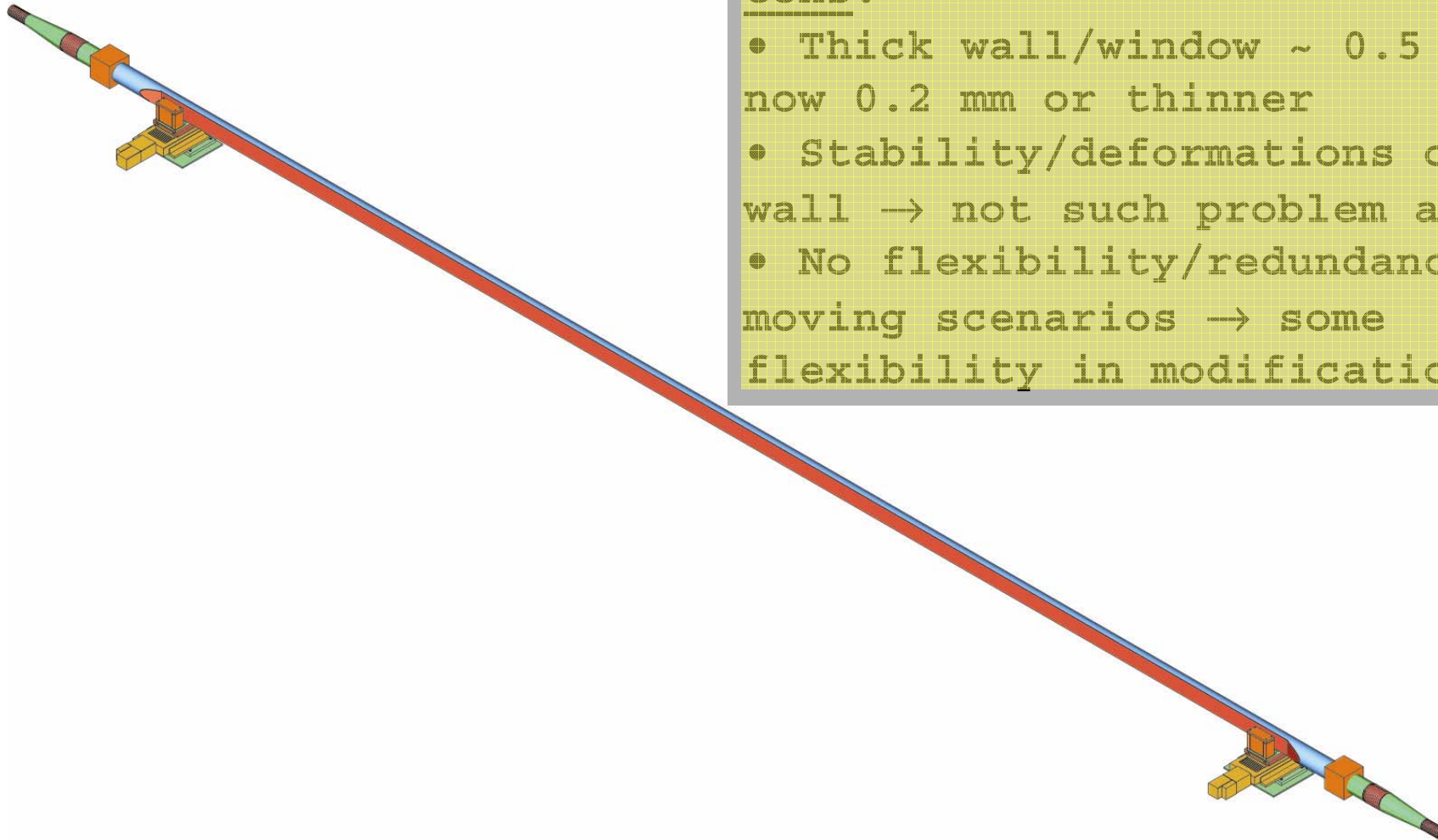
... and propose modular pipe design - easier to transport and install in cryostat + possibility of replacing by another sectors (e.g. with pockets)

Pros:

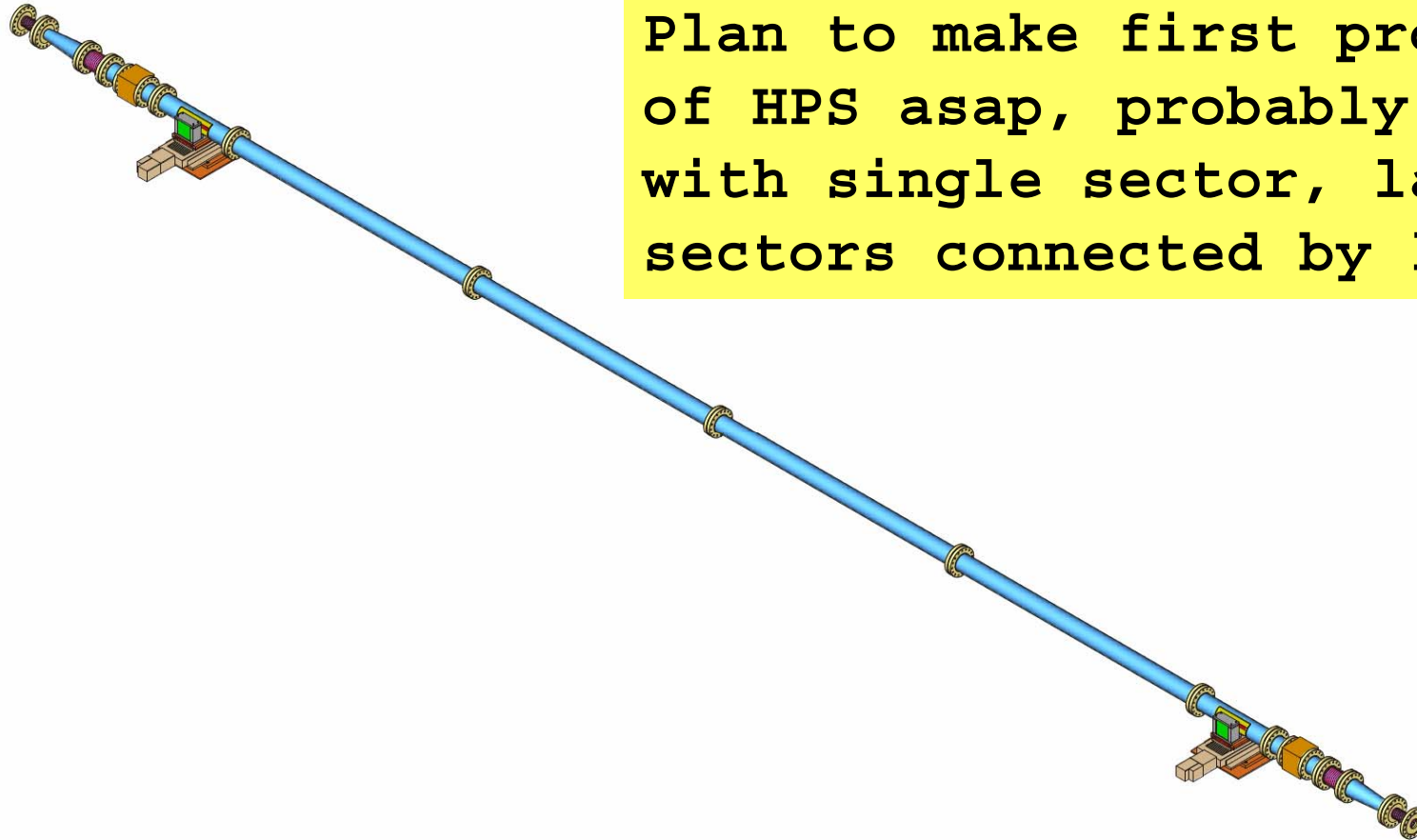
- One simple structure with 2 BPMs
- Only one entrance window → 3 windows
- Flexibility in number of detectors/positions → now more limited

Cons:

- Thick wall/window ~ 0.5 mm → now 0.2 mm or thinner
- Stability/deformations of thin wall → not such problem anymore
- No flexibility/redundancy in moving scenarios → some flexibility in modification left

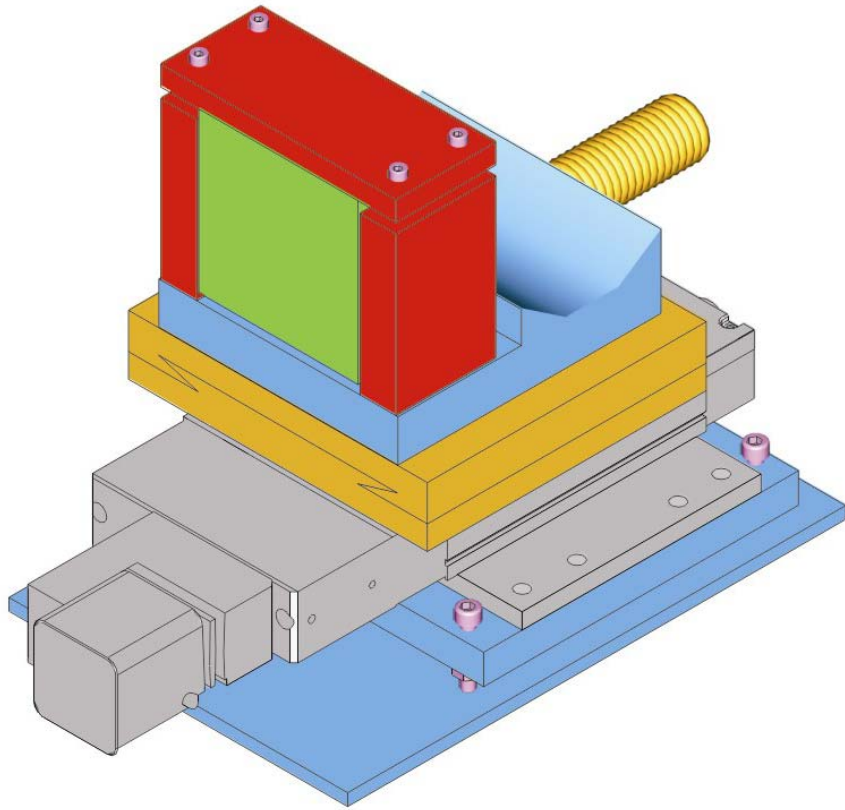


Next steps

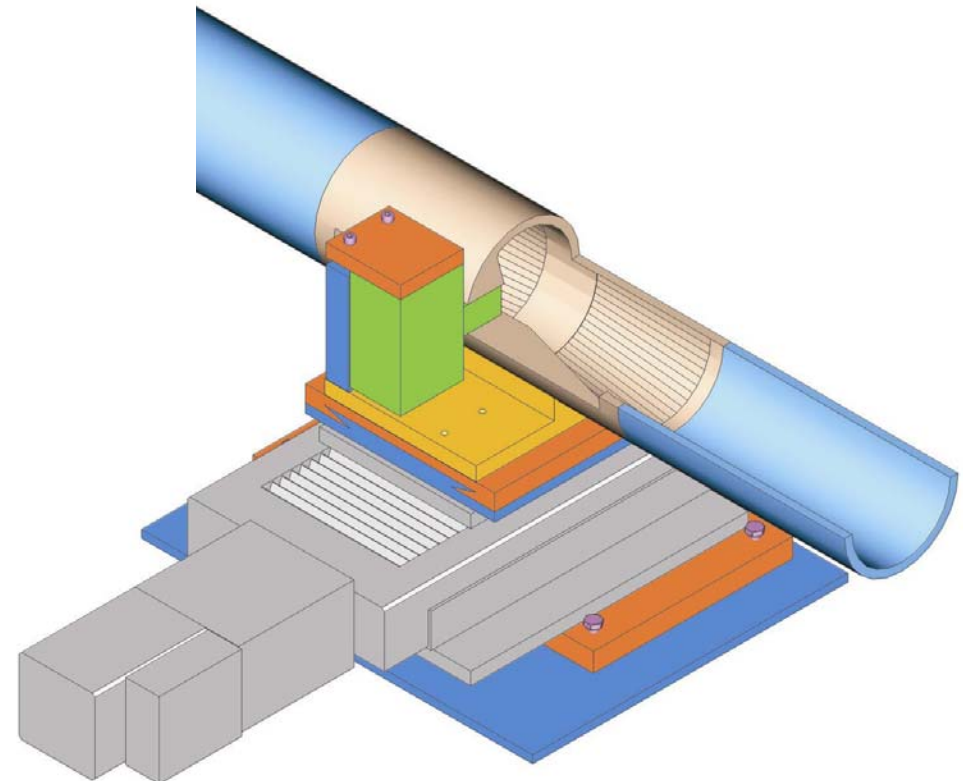


Plan to make first prototypes of HPS asap, probably first with single sector, later 2 sectors connected by long pipe.

Urgently need to study supports/integration into cryostat!



Detector
fixing/support/
positioning/security



Further studies

- impact on LHC beam - RF studies (pocket design),
- mechanical aspects - precision, stability,
- detector performance (resolutions)/integration (cooling),
- accessibility and risk analysis